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PROFESSOR W. P. BLAKE has returned to New Haven, after a five months' absence in Montana, California, Utah, New Mexico, and Arizona.

MR. MOSES TAYLOR, of this city, has contributed $250,000 to found a hospital at Scranton, Pa., for the employés of the Delaware, Lackawanna & Western Railroad Company and the Lackawanna Coal and Iron Company.

A NUMBER of gentlemen connected with the anthracite coal trade have presented FRANKLIN B. GOWEN, President of the Philadelphia & Reading Railroad Company, with a silver vase "as a token of grateful remembrance of his services in suppressing lawless violence and establishing security for life and property in the anthracite coal regions."

THE seed sown during the time of the mining "boom" is beginning to bear fruit in the shape of business for our courts, in which the victims of wild-cat enterprises are seeking redress for their wrongs. Two suits are now pending before the Supreme Court in this city, which throw a flood of light on the inside history of some of these concerns.

THE question of a standard wire and metal gauge is again discussed in England, but apparently with no more prospect of a successful issue than attended the earlier efforts of the American Institute of Mining Engineers and other bodies in this country and in Europe. The conservative element in the trades interested seems to be dead weight, which only more powerful agencies can move.

SINCE the great influence which coal-dust exercises in colliery explosions has been clearly ascertained by GALLOWAY'S exhaustive experiments and observations, there have been many proposals to avoid the danger by sprinkling. The latest in this direction comes from Mr. ROBERT STEVENSON, of Stoke-on-Trent, who found by trial that while water did little good, a solution of salt acted very well.

THE American Society of Mechanical Engineers will hold a meeting at Philadelphia on the 19th, 20th, and 21st inst. A Holley memorial session will be held on the afternoon of the first day of the meeting, and on the second day, Prof. T. EGLESTON will address the society in relation to a joint effort on the part of engineering and technical organizations to secure the re-establishment of a United States Commission to test iron, steel, and other materials. A number of valuable papers is already announced, and arrangements have been made for visits to works in the vicinity of Philadelphia. These, with a reception and a banquet, point to a very successful meeting.

ELECTROLYTIC processes are apparently gaining in favor among metallurgists. Silver has been the latest addition to the list of metals which it is proposed to deposit from solutions by this means. It is announced in a current issue of one of our German contemporaries that Herr RÖSING, favorably known in his own country, has concluded, after some experimental trials, to introduce at the copper-works of Innai, Japan, a modification of the Augustin process. Instead of precipitating the silver from its solution by copper, as hitherto, he intends to deposit it with the aid of a current produced by a Siemens and Halske dynamo-electric machine.

THE statistics just published of the trade movement of New York for the first quarter of this year, and for the corresponding period a year ago, strikingly illustrate the manner in which the bull speculation in produce and other influences have changed the current. For the first three months of 1881, the total foreign imports at New York were $121,928,320, of which $12,626,630 was specie and bullion. This year, the imports were $131,045,522, of which only $1,081,415 was specie and bullion, a falling off of over eleven millions of dollars. The exports, which were $98,214,986, inclusive of only $3,523,079 in the first quarter of 1881, have dropped to $93,030,684, of which $13,858,000 was specie and bullion.

ONE of the ways in which money can be made in mining is to avoid the districts where public excitement and sudden increase of population have produced extravagant expectations and prices, seeking, on the other hand, districts which have entered upon the period of reaction, and have become temporarily neglected. In these places, good mines may be secured at low prices, and reasonable expectations and profits abundantly realized. A case of this kind appears to be presented by the Granite Basin Mining District, of California, described in another column by a trustworthy correspondent. We can only say that the writer has been personally known to us for many years, and that we have always found his statements in mining matters to be careful and moderate. Whoever is sufficiently interested to desire further information concerning this district, can obtain from us some special reports and maps now temporarily in our possession, and also the address of our correspondent.

THE Board of Directors of the American Society of Engineers has presented a memorial to the chairman of the committee to which was referred House Bill No. 4726, providing for the appointment of a commission of experts to test structural materials. This memorial forcibly points out the reasons why it is of great importance to the public safety, as well as to the economical use of materials by builders and manufacturers, and by the government itself, that iron, steel, and other materials used for structural purposes, should be tested on a large scale. It urges that there is no prospect that the necessary tests will be made by private parties, or that those carried out will be performed in such a way as to make the results generally available and their character what is really required. It therefore prays that the President of the United States be authorized to appoint a commission of paid experts, skilled in the investigation, production, and use of structural materials, and that appropriations be made to improve the Watertown testing-machine, if necessary. The efforts of the society should be indorsed by all who are engaged in the manufacture and working of metals of all kinds, as all branches are deeply interested.

MESSRS. HAMILTON S. WICKS and J. B. RYCKMAN, who are here in the interests of the National Exposition Association of Denver, have addressed the Governing Committee of the New York Mining Exchange, Mr. RYCKMAN

speaking generally on the benefits of such expositions to the industries interested, while Mr. WICKS dwelt more particularly on the aims of the Denver Exposition and the means contemplated to make it a success. The committee ordered that five thousand of these addresses be printed, and a motion was passed that the president appoint a committee of five to consider the best means of aiding the enterprise. We understand that it is proposed to raise $200,000, of which $75,000 have been subscribed by the city of Denver, while it is expected that $25,000 will be taken in Colorado. The rest of the bonds, $100,000, are to be placed in the East, and it is urged that the magnitude of the interests involved in this section of the country entitles the enterprise to substantial aid from this quarter. We are informed by Mr. WICKS and Mr. RYCKMAN, whose headquarters will be at the Hoffman House, that no charge will be made for space, and that the cost for power will be as low as possible, so as to induce a full representation of the mining and allied industries. As to the *personnel* of the Exposition Association, we might add that the director of the Denver Mint, H. SILVER, has accepted the position of Acting President; that Mr. S. T. ARMSTRONG, late manager of the Western Union Telegraph Company, has become Secretary; and that Hon. H. D. PERKY is General Manager. Among those prominently connected with the undertaking are J. T. CORNFORTH, Lieut.-Gov. H. A. W. TABOR, Hon. W. A. H. LOVELAND, Gov. A. C. HUNT, and Hon. F. W. PITKIN, Governor of Colorado.

THE GRANITE BASIN MINING DISTRICT.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: This camp lies from three to four miles south of the stage-road from Oroville to Quincy, in the southwest part of Plumas County, California, about forty-four miles from Oroville to the nearest railroad station. Over twenty years ago, the gulches of the district were mined, and are said to have paid well. The gold found is mostly fine. At present, Chinamen are mining the few poorer gulches left by the restless miners of early days.

Three ledges in those days were discovered and mined: the Mexican, the Caldwell, and the Jennie. To work the quartz of the Mexican, one of the first quartz-mills put up in California was built. The quartz paid $30 per ton free gold, as report goes, which was thought too low for pay in those days. The mill was subsequently burnt down. For the Caldwell mine, an eight-stamp steam mill was put up and some of the rock was worked, the reported yield having been $30 per ton in free gold; but a disagreement occurred between the owners of the mill and of the mine, and work on the mine was abandoned. Subsequently, the same mill worked some hundred tons of quartz from the Jennie mine, said to have paid $10 per ton free gold, which was considered too low. The district remained in complete idleness for a long time, until, a few years ago, a prospector discovered the Granite mine, obtained possession of the eight-stamp mill above mentioned, applied water-power, and made several thousand dollars out of the Granite, Caldwell, Mexican, and other mines. A good prospector is proverbially a restless man, and leaves the benefit of his discovery to more steady hands. This is the story of these mines as well as of the Green Mountain mine, discovered by the same man. The opening of the Granite mine brought into the district more activity, and led to additional discoveries. At present, the status of the district is the following:

Two miners, See and Jolly, have two mines on the northwestern side of the district, from which they take out ore in summer and fall, and crush it in a four-stamp water-power mill generally in winter and spring, thus taking advantage of high water. They are 50 and 80 feet deep on their mines, and find that their ledges are increasing in richness as they go down. They get only the free gold in the quartz, and yet their success is complete. The Morning Star and Trenton mines, in the southeastern part of the district, both on the same ledge, were bought last spring by the United States Surveyor-General for California and his friends. A twenty-stamp water-power quartz-mill was put up in the fall. A concentrator intended for the mill was shut out of camp by the winter storms. But being crowded with rock, a run was made on poor rock, and the sulphurets saved with blankets. The result is not yet known, but there is every indication of successful working. The Granite and Mexican properties fell into other hands; the Seibert, Franklin, and other mines were discovered; and two additional mills put up, which are now held by men of small means, not able to make the necessary improvements to work the mines and reduce the ores economically. Most of the mines are in granite rock, frequently soft and easily mined, the veins being small, from 6 to 30 inches wide. About one half of the gold in the ores is in a free state, and the remainder is in sulphurets, of iron mostly, though some arsenical and copper pyrites are found. The ore ranges from $5 to $30 per ton in free gold. The sulphurets contained in the ores may be reckoned at about five per cent, assaying from $50 to $150 per ton.

The district offers a good chance for an extensive enterprise depending on the profits of *bona-fide* mining, carried on with economy, experience, and skill. As the gold is not all free in the ores, but contains a good percentage of rich sulphurets, there is need of more thorough appliances for reduction, and a more expensive plant to carry an enterprise of this nature, and hence it is thrown out of the means of small capital. The mines are generally still held in first hands, and can be obtained at comparatively low figures. The Little North Fork of Feather River rises on the northwest of the district; thence running on its western and southern sides, emerges out of it on the southeast corner, giving a water-power of great value to an enterprise of this kind. The hills on which the ledges are found are so situated that some of them can be worked from seven to nine hundred feet deep by comparatively short tunnels. Forests of sugar and yellow pine, red and white fir, and cedar trees, attaining commonly a diameter of trunk of four to six feet, cover the hills, while the spruce and oak are more thinly scattered. All these trees are good for lumber and mining timbers, as well as for fuel. Labor is cheap; from $40 to $50 per month and board is paid to laborers and miners. Good board is obtained for from $5 to $6 per week.

There is a prejudice in the country against the district as to the permanency of its mines, arising probably from the manner in which some of the other mines were worked after the discovery of the Granite. These mines were "hogged" (using a mining term in such cases); that is, all the good paying parts were taken out to the detriment of the general work, leaving the mine in a barren state. This, however, is not of a serious nature, as no mine has yet been worked over a hundred feet deep. First-class talent in mining matters could avail itself of this state of things to the advantage of capital that seeks investment. ORO.

"SILVER SAN JUAN."

Special Correspondence of the Engineering and Mining Journal.

Under the above caption (which I used in writing some articles for the London *Field* four years ago) there appears in *Harper's Monthly* for April an interesting and most ably written article, illustrated with some really beautiful little wood-cuts; and were it not for the well-known standing of the Harper Brothers, it would pass for a very clever and expensive advertisement of the town of Silverton in particular, and its immediate surroundings in general. It is generally believed, however, that the pages of *Harper's* can not be bought at any price. When a man, or party of men, purchase or hire a page of a newspaper, and fill it with wood-cuts of highly ornamented banks and stores, with flowery reading matter descriptive of these and the town in which they happen to be pecuniarily interested, they have no doubt a perfect right to put in all the lies they think proper; but when reading matter and illustrations are furnished by a magazine of high standing, as purely disinterested information, as in the article referred to, the glaring misstatements therein made seem to be extremely out of place.

The writer begins by stating that eight years ago he prophesied that the San Juan region would be reached by rail from the south; and showing how this has been fulfilled, he goes on to say, "While two approaching lines from the northward have halted, baffled, on the other side of the range, the southern extension westward of the Denver & Rio Grande Railroad has already pushed its track to the lower end of the cañon, and before this article meets the reader's eye, its locomotive's whistle will doubtless be heard in Baker's Park." "Baffled," eh? Not very badly, I think; for only four weeks ago I went from Gunnison City by the Denver & Rio Grande Railroad up the southern slope to the summit, and then down the northern slope of the range to the point where that railroad is supposed to have "halted baffled." The other, the Denver & South Park Railroad, is apparently not very badly "baffled" either, as it has bored a tunnel clean through this insurmountable range, and will be in Gunnison also this summer. This portion of the Denver & Rio Grande is the main line, and is rapidly building onward from Gunnison City to Utah, and by connection with the Utah Southern & Central Pacific Railroad to San Francisco, passing within about 35 miles of the towns of Ouray and San Miguel with the main line, while branches have been surveyed and will be built to both of these places. On the other hand, the line to Durango (building to Silverton) is only a branch of the Denver & Rio Grande, and reaches that point, as will be seen by referring to the map, by a very long and roundabout route. Silverton with her mines is therefore in the anomalous condition of being a mining district on the Pacific slope, dependent on the Atlantic slope for her supplies and machinery, whereas the mining camps of Ouray, Lake City, San Miguel, the Dolores country, and the big unknown tract just vacated by the Indians are tributary to the main line of the Denver & Rio Grande Railroad, and will get their supplies and machinery from Utah and California adjoining, instead of from the Eastern States on the other side of the main range of the Rocky Mountains.

The only boundaries of the "San Juan Mining Region" are those which have been defined by long use and the general understanding of the term; and although the writer in *Harper's* has seen fit to set up boundaries of his own, and, as he confesses, for the purposes of his essay, they are far from correct, and give a most erroneous impression.

The San Juan region has always been understood to comprise Ouray, Dolores, Hinsdale, La Plata, San Juan, and Rio Grande counties, a very good map of the same having been made by Mr. A. F. Kibbe, of New York, and published by George H. Adams & Sons, 59 Beekman street, New York, and another by Mr. Moritz Stockder, M.E., of Lake City, Colo.

In this region are the well-known rich mining districts, having each its own particular town or outlet as follows: Ouray, having the Sneffels, Uncompahgre, Bear Creek, Red Mountain Gulch, and Poughkeepsie Gulch mines tributary to it; Lake City, having the rich mines of Hensen Creek, Engineer Mountain, and a large number immediately around the town itself; San Miguel, having the celebrated gold and silver mines of Marshall Basin, Ingram Basin, Bear Creek, Turkey Creek, and twenty miles of placer claims on the San Miguel River; Ophir, having its own rich mines all around it; Rico, being the center of all the mines of Dolores County, and having an outlet by the Denver & Rio Grande Railroad near Durango, and at a distance of about twenty-eight miles. With the exception of the latter, all these are tributaries to the main line of the Denver & Rio Grande Railroad. Silverton has tributary to it some remarkably good mines immediately around the town, and those of Cunningham Gulch, Eureka Gulch, and Animas Forks, and has its outlet, as aforesaid, by the Denver & Rio Grande Railroad, now under construction from Durango to Silverton. But Silverton is separated from all the other districts mentioned by a high range of mountains, at present passable to animals only during the summer months, and with no earthly reason that I can see for ever needing an all-year-round connection.

Thus it will be seen that Silverton is the center or outlet of a very small portion of the San Juan region, practically isolated from the larger and more important portion of it, and not by any means, as stated on page 692 of the magazine in question, "the center of Silver San Juan;" and if the writer of that article will kindly take a trip into the San Juan proper via Gunnison City, this summer, he will realize what a very great injustice the tenor of his article does that remarkable region.

It is not only to the country that an injustice has been done. The Denver & Rio Grande Railroad Company is a most powerful and enterprising one, and is the prime factor in the good work of developing the wondrous mineral riches of that portion of Southwestern Colorado known as San Juan. This railroad, instead of "halting baffled," has, by a remarkable feat of engineering, crossed the main range by Marshall Pass into the Gunnison and San Juan country, and is rapidly making for Utah, the construction being pushed at both ends. In its course westward, it passes through what are now known as the coal-fields of New Colorado, and which comprise an area of more than 15,000 square miles. The coal is bituminous and anthracite; the former at Crested Butte, on the Denver & Rio Grande Railroad, and where the Colorado Coal and Iron Company has coking-ovens, is said to be the superior of any other coking coal in the United States; and the anthracite found at the headwaters of the Gunnison is said to be as good as any in Pennsylvania. Has not a marked injustice been done to the Denver & Rio Grande Railroad also?

W. WESTON.

OFFICIAL STATEMENTS AND REPORTS.

ALICE, MONTANA.

In a letter dated April 7th, to R. G. Lansing, Assistant-Secretary, J. B. Walker, President of the Alice Gold and Silver Mining Company, says: Every thing at the Alice works is in good condition, developments being prosecuted as heretofore. The old Magna Charta shaft is now down 70 feet below the 400 level, and in a short time from now the station will be cut at the 400-foot level. During the past month, there were extracted from the mines and reduced at the mills 2244 $\frac{561}{1000}$ tons of ore of an average value of $39.03 per ton, amounting to $87,602.03. The assay value of the bullion produced for the same length of time is $89,986.05, or an average of $40.09 per ton of ore worked. The product for March would have reached $100,000, but for the stoppage of the new mill four days on account of the fly-wheel requiring keying up, and some other repairs. Work is done on every level from 100 to 700 of the Alice, and on 100 to 400 of the Magna Charta. The Magna Charta and Alice mines are now connected by a tram-road, and the ore from the Magna Charta slopes is run on cars and dumped in the mills without change. The new Magna Charta hoisting-works are not yet completed. It is expected the machinery for these hoisting-works will arrive shortly. The Hawkeye shaft, the fourth one on the Alice Company's property, is now down 121 feet. This shaft is about 300 feet south of the main Alice shaft.

NEVADA MINES IN 1881.

We are indebted to Mr. J. F. Hallock, State Comptroller of Nevada, for a copy of his annual report for the year 1881, from which we take the following table of the production of the mines for the fiscal year ended September 30th, 1881:

	Counties.	Quantity worked. Tons.	Gross yield or value.
Ores—	Elko	3,335	$221,905 08
	Esmeralda	37,389	1,490,457.42
	Eureka	77,005	3,168,543.91
	Humboldt	5,448	74,920.05
	Lander	7,036	959,419.05
	Lincoln	3,206	87,904.75
	Nye	18,089	465,269.14
	Storey	88,510	1,565,000.98
	White Pine	8,299	365,952.30
	Total, ores	248,317	$8,409,373 38
Tailings—	Humboldt	5,833	$20,170.15
	Lincoln	8,095	83,109.43
	Lyon	77,906	346,031.02
	Ormsby	41,005	179,496.02
	Storey	37,913	176,560.64
	Washoe	5,256	39,533.42
	White Pine	12,834	41,740.44
	Total, tailings	188,843	$886,641.12
Salt, etc—	Esmeralda	15,570	$209,956.61
	Grand total for the year ended Sept. 30th, 1881	452,729	$9,505,971.41

THE ROSARIO MINE, HONDURAS.

The officers of the New York & Honduras Rosario Mining Company, of which Walter T. Marvin is President; Isidore Valentine, Vice-President; Julius J. Valentine, Treasurer; and W. S. Valentine, Secretary, publish "facts relating to the Rosario mine, by request of the stockholders." In this pamphlet, they give an extract from a report of the Mining Commissioners of Honduras, made in 1879, and an extract from the report of the late C. O. Wederkinch, written in the same year. This is followed by extracts from reports of T. R. Lombard, the present superintendent; by extracts from the annual report of the president, dated December 14th, 1881; and a copy of a letter written January 18th, 1882, at San Juancito, by the superintendent. From these statements, it would appear that the Rosario is an old mine, long worked by the Spaniards. It is located two miles from the village of San Juancito, twenty-five miles from Tegucigalpa, the capital of Honduras. It has a vein of gold and silver-bearing quartz, averaging three feet in width, and dipping to the south. The old workings had reached a depth of about 200 feet, and extended westward into the mountain. Mr. Wederkinch reported that an average of all assays taken from the whole vein in the lower part of the workings was 1·5 ounces of gold and 7·81 ounces of silver. The present work consists in driving a tunnel about 240 feet below the old entrance to the mine, 300 feet through country-rock, so as to strike the vein on a level with the lowest part of the workings, this tunnel being in 225 feet, according to the reports of the superintendent. Above the tunnel or No. 5 level is located a level, No. 4, which is driven from various parts of the old workings, the ore in the western heading in virgin ground being reported to assay $50.20 per ton. A road has been built from the mine to the mill driven by water-power; three Kendall stamps, estimated to be able to crush two tons per day, being ready to run, and part of seven additional Kendall stamps being on the ground. The ore is represented to be free milling, and the cost of stoping and working is placed at $11 per ton. A map is appended to the report, to illustrate the present condition of the new workings.

PRESSED RETORTS FOR ZINC DISTILLATION.

In the *Revue Universelle des Mines*, M. Léon Hiard describes a method of shaping the retorts used for zinc manufacture in Belgium, an abstract of his paper being given in the Foreign Transactions and Periodicals of the Institution of Civil Engineers. In the manufacture of the retorts, which are employed for smelting zinc, the boring plan hitherto usual in Belgium—consisting in boring the inside out of a solid block of clay that has previously been molded by hand to the external shape of the retort—is now being extensively superseded by M. Dor's process of molding the clay to the required shape, both internally and externally, by the use of hydraulic presses. In the first press, a compact homogeneous cylinder is progressively built up in a mold with clods of clay from the grinding-mill, which are added in succession as the block becomes consolidated under the hydraulic pressure. In the second press, the solid block is molded into a hollow retort by the pressure of a smaller ram, by which the central portion of the mass is forced outward into the annular space between the ram and the mold. In Ampsin's press, the molding pressure is exerted only by the central ram; but in Valentin-Cocq's more recent differential press, an annular ram, surrounding the central ram, exerts a consolidating pressure upon the growing walls of the retort; this makes a better retort, though the process is rather slower than with Ampsin's press. The comparison between the two modes of manufacture—by boring and by pressure—is considered by M. Hiard to stand as follows: The bored retorts must be shaped circular in transverse section; and the clay has to be in a softer state for making them. The material bored out exceeds 60 per cent, all of which has to be returned to the grinding-mill. A loss of 2½ per cent arises from the retorts warping and cracking in the processes of drying and burning. The finished retorts are more easily damaged by a blow from a furnace tool, or by a jolt in conveyance. They absorb more zinc from the charge smelted in them, and are themselves attacked more rapidly by the ingredients of the charge. The number of retorts used up per ton of ore smelted is estimated at 2½ to 3.

On the other hand, the pressed retorts are shaped to any desired section by using molds and rams of that shape; they are made of drier clay, and hence stiffer kinds of clay can be used. The heavy pressure under which they are molded makes them strong and close; there is no loss in drying, and the finished retorts do not break so easily. When made on the spot, 1·6 retort suffices per ton of ore smelted; at other works, to which they have to be conveyed ten miles by rail, 2 retorts per ton are required, to cover damage from jolts. Hydraulic pressure has the advantage of squeezing out both water and air more thoroughly from the solid blocks formed for molding the pressed retorts, than can be done by ramming the material with the blows of stampers; and M. Hiard suggests the desirability of using a pair of hydraulic rams to compress the block between them from both ends.

In the Liége zinc-smelting furnaces, the average duration of the pressed retorts is twenty-five days; each smelts rather less than ½ cwt. of ore per day. The retorts are usually made of oval section, 12 inches by 9½ inches outside, with walls 1½ inches thick, and bottom 1½ inches; their length is about 4½ feet. The clay of which they are made is composed of ingredients mixed in the following proportions according to bulk, each ground and screened beforehand: Raw clay, 35 per cent; sand, 30; old retorts, 25; and coke, 10 per cent.

THE DETERMINATION OF PHOSPHORUS IN IRON.

After having been engaged more or less for two or three years in examining the question of the determination of phosphorus in iron and steel, Dr. J. Lawrence Smith, of Louisville, Ky., has adopted a method which he describes at length in the *American Journal of Science*. He dissolves one gram of the iron to which three or four centimeters of water have been added in ten to fifteen centimeters of aqua regia, gradually added. After boiling to dryness, he heats for thirty minutes or one hour to 140 to 150 degrees C., in order to render silica insoluble. Three or four cubic centimeters of hydrochloric acid and as much water are added and gently warmed, and the solution filtered with the filter pump. The filtrate is diluted till it makes about 100 cubic centimeters. From 90 to 92 cubic centimeters of this solution are placed in a platinum capsule having a capacity of 300 or 400 cubic centimeters, and 100 cubic centimeters of water are added. The iron oxide is now reduced to protoxide by two or three centimeters of sulphite of soda or ammonia, and the solution is boiled until all the sulphurous acid is driven off. Ammonia is now added to the warm solution until a little of the greenish precipitate remains undissolved. About 20 cubic centimeters of acetic acid are added, and one or two cubic centimeters of ammonia acetate solution, and finally the 8 or 10 cubic centimeters of original solution remaining in the graduated glass are added, with 200 or 300 cubic centimeters of water. Boil gently for one half to one hour, the result being the formation of a basic persalt of iron, containing practically all the phosphorus. The phosphorus is separated from this precipitate in the following manner: Collect it on a 3½-inch filter, and a hot acid solution of from 5 to 6 cubic centimeters of hydrochloric acid and as much water is put in the filter. The hot solution is boiled to dryness, and 1 to 2 cubic centimeters of nitric acid and as much water added. Ammonia is added until the precipitate formed is not redissolved, and a few drops of nitric acid are allowed to flow into it. The phosphorus is then precipitated as the double ammonia salt, by 20 cubic centimeters of molybdic acid solution, warming 15 to 20 minutes to a temperature of 80 degrees Celsius. The filtrate is washed with distilled water, on a double filter, the latter dried in an air bath at about 120 degrees Celsius, and after separating the filters, weighed. Of the phospho-molybdate, every 100 milligrams will contain 1·63 of phosphorus and 3·74 of phosphoric acid.

COPPER REFISING IN THE UNITED STATES.—III.*

By T. Egleston, Ph.D., New York.

When the assay shows that the furnace is ready, ladling is begun, and a test is made from time to time, during the casting. During the time of casting, it is necessary that the gas in the furnace should be kept neutral, or that there should be an equally balanced oscillation between an oxidizing and reducing action, so that the copper will neither be under-poled nor over-refined. The casting-door, remaining open during all the time of the casting, furnishes some oxygen, but not too much if the fire-place is in proper condition, as the air goes directly up the chimney. During the whole time of casting, the face of the copper must, for this reason, be kept covered with charcoal, and sticks of cord-wood kept burning on the surface of the charge so as to make the atmosphere reducing. It rarely happens, however, that the furnace is kept in exactly the same condition during the whole time of casting, as the analyses given below show, so that frequent tests must be made to see when the pitch changes, and occasionally the operation of casting is stopped and the furnace closed to bring the heat up and the pitch back to its proper condition. A well-regulated furnace ought to have the temperature as well as the quality of the heat such that no stopping will be necessary during the casting. It is, however, an exception to have the furnace work continuously without stopping. The following determinations of oxygen were made in the same series and on the same charges as those given under poling. A greater variation is very often shown, but these are about the average of good working :

	OXYGEN.					
	1	2	3	4	5	6	7
Ready for ladling.....	0·10	0·24	0·29	0·24	0·60	0·22	0·11
Ladling half done.....	0·12	....	....	....	0·19	0·41	0·10
Last of the charge.....	0·10	0·30	....	0·30	....	0·43	0·12

Sometimes the furnace is too cold. Other things being equal, this does not affect the quality of the copper, but it makes the ingots dirty looking and increases the difficulty of the work.

The copper is cast into different shapes, according to the uses to which it is to be put. If it is to be made into rods or wire, it is cast in rectangular iron molds, which have been previously washed with wood ashes, and dusted with fine charcoal from a bag, or have been smoked with wood, to prevent the adherence of the copper to them. These molds are from 25 to 40 inches long, and from 3 to 7 inches square. They are made to taper for about 6 inches from one end to about 2 inches square on the bottom and sides, the top remaining flat, so that they can be made to enter the rolls easily. They are always made of the size required for the number of ladles they are to contain, and generally weigh from 80 to 100 pounds.

When the copper is to be rolled into sheets, it is cast into cakes, which are of any size or thickness required. The small cakes or plate-molds are usually square, the larger ones rectangular or round. They are generally from 18 to 32 inches square, and 10 to 15 inches deep. The smaller ones are usually 14½ by 18½ inches, and about 12 inches deep. In such a mold, five cakes about 2 inches thick will usually be made. A cake 2 feet square and 4 inches thick will require fifteen ladles of 40 pounds each. Round cakes 3 feet in diameter and 1 inches thick are sometimes made, which will weigh as high as 2500 pounds. The largest square casting-molds are 3½ feet square, 10 inches deep, 1½ inches thick on the sides, and 3 inches on the bottom. A cake 6 inches thick, made at Pittsburg, by C. G. Hussey & Co., from such a mold, weighed 3135 pounds. When the copper is to be used for melting, it is cast into ingots, in copper molds, the ingot weighing from 16 to 17 pounds.

A great deal of importance is given by many to the color of the copper, and many qualities of it are distinguished in the market by their color. The temperature, at the time of casting, will not only affect the color, but will also change the appearance of the fracture. This is so well known that most copper smelters ladle at as low a temperature as possible, in order to have the grain fine. The real and only test is not the color, but that the copper should be tough and malleable at all temperatures. Buyers, however, sometimes require copper to be of a certain color on the exterior, which, as is well known, does not give any positive indication of the quality of the copper. The coloring is only superficial, and, independently of the heat of the metal at the time of casting, can be given in several ways. Salt put into the water makes the copper dark red. This salt is simply put into the bath into which the copper tips. White-pine shavings put into the water make the copper yellow. The same takes place wherever the ingot, being thrown over, hits the wood of the sides of the water-bosh. To form these colors, which are asked for specially, the ingot is tipped out upon a shovel, and then dropped into the water.

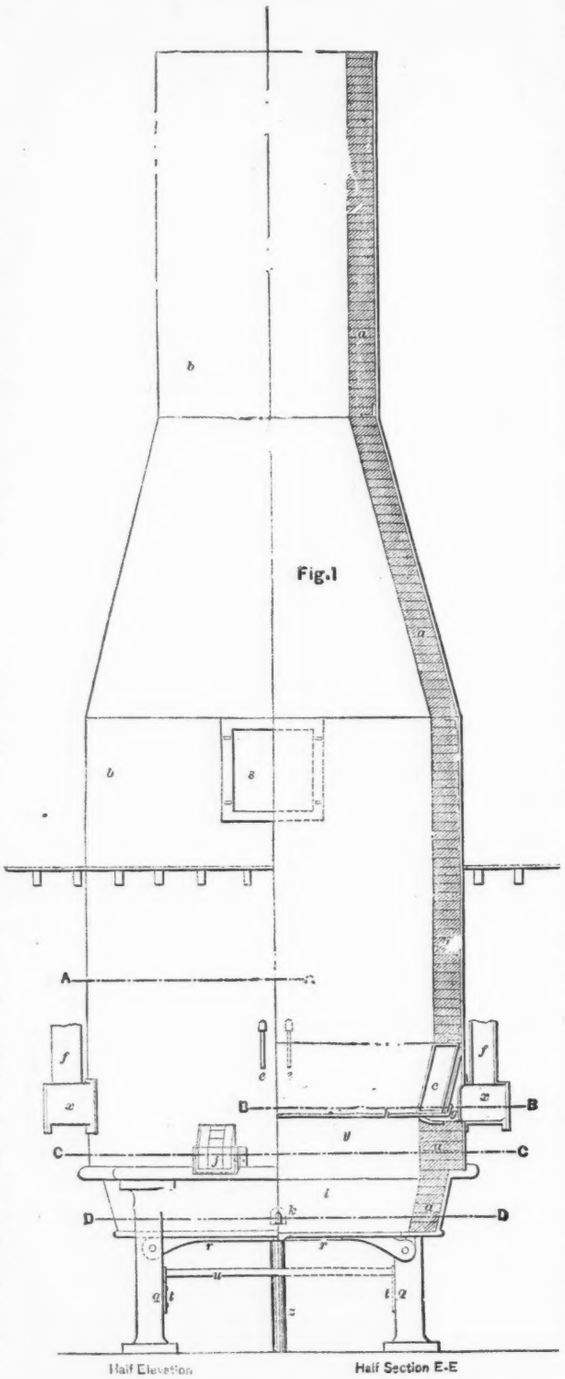


Fig. 1

The copper at Hancock is cast at a higher temperature than is usual, to which the beautiful and uniform color of their ingots is mostly to be ascribed. The men have been so carefully trained, and are so very skillful, that they can produce great uniformity in the color. The care which is there taken to keep the quality of the heat the same produces a copper containing less suboxide than any other, and hence it is much sought for when very pure copper is required. I have examined many samples which did not contain more than from 0·03 to 0·05 per cent of oxygen, and a few containing only 0·01 to 0·02, which is, so far as I know, not true of any other except Arizona copper, though any of the works could do it if they would take the trouble.

The greatest care is taken to keep the products of each mining company separate. Every company has its own ingot molds with its name in the bottom, so that each of the ingots has the name of the mine from which the copper comes cast on it.

It is not easy to calculate the cost of the operation of smelting. The works at Hancock naturally control the price, as all the other works in the United States put together would not be capable of turning out at the present time much more refined copper than they do. They are naturally very uncommunicative about their business transactions, and the probable cost can only be estimated. That they make a very large profit, the dividends which they declare make certain; what that profit is, can only be known approximately. The work of smelting is done at a fixed price per ton of ore or mineral, no matter whether this is No. 5 mineral, which only contains 35 to 40 per cent, or No. 1, which contains on an average 90 per cent, or masses, which are nearly pure copper. Up to within three or four years, this price was $18 per ton of ore and $15 per ton of slag. Latterly, this price has been reduced to $17 for the ore and $12.50 for the slag at Hancock, and $15 for the ore and $10 for the slag at Detroit. It is therefore for the interest of the mines to send to the smelting-works the richest possible products. At Hancock, all the coal, flux, and other material is brought to the works as return freight in vessels that would otherwise come back from the East empty. Each furnace uses four tons of coal in twenty-four hours, which costs $4.40 per ton. For labor there are two men for the first shift of twelve hours, and six during the second shift, which lasts until they are through. The furnace man is paid $3.50, two helpers $3 each, and the other $2.50 per day. There will thus be $19 a day expense for labor.

Dr. Kupelwieser* calculates the cost as follows :

	Per ton of ore.	Per ton of copper.
Labor at the furnace	$2.40	$2.93
Other labor	1.00	1.23
Four tons of coal@$4.40	2.20	2.70
Cost of direction	3.00	3.70
	$8.60	$10.56

This shows a very handsome profit for the works. This estimate seems to be a low one; but, however near the truth it may be, it is certain that the very large amount smelted, and the peculiar facilities for freight, make it possible to treat the ore for a comparatively small sum.

The second part of the operation consists of the fusion of the rich scorias in the cupola furnaces, which gives as a result poor scorias, which

* Abstract of a paper read before the American Institute of Mining Engineers.

* Bericht über der Weltaustellung in Philadelphia, 1876; Vienna, 1877, p. 277.

are thrown away, and a black copper containing a great deal of iron. This operation is conducted in different ways at different works. On the lake, the slags are simply smelted in the cupola. At Pittsburg, they are first submitted to a treatment in a reverberatory furnace, and the rich slags from this treatment go to the cupola. The cupola furnaces which are used are also quite dissimilar. The treatment on the lake will be given first, and afterward that at Pittsburg, in so far as it differs from it.

At Hancock and Detroit, most of the slag, except what shows metallic copper, which is skimmed during the night, goes to the cupolas. All that is skimmed during the poling goes back into the refining furnaces. The slag which goes to the cupolas will be about 35 per cent of the charge in the reverberatory furnace. The scorias from the treatment of the copper from each mine are always kept separate and treated separately. The scorias, as the analyses show, contain metallic copper in grains, oxide of copper, oxide of iron, alumina, lime, and magnesia. The object of the fusion is to melt and collect all the copper which is in grains, to reduce the oxide of copper, and to get another set of scorias poor enough to be thrown away; to accomplish this, some iron must be reduced, but in order to make the quantity as small as possible, the oxide of iron is left to take all the silica it can get from the bricks of the furnace. The slag generally contains from 5 to 12 per cent of copper, some of which is in the shape of grains of metallic copper, though the analyses of the slags show much lower than this. The average of the working of many hundreds of tons is given, however, at the works, as between these two amounts, though I have frequently seen very large pieces of suboxide of copper, and have analyzed a number which contained over 40 per cent. The furnace which is used on the lake is a modified Mackenzie's cupola. This furnace was originally invented for the fusion of cast-iron, but has been so modified that it is now the best furnace in use for the treatment of copper slags. Its peculiarities are the water-bosh, the tuyere, which is in the shape of an opening five eighths of an inch wide all around the furnace just below the water-bosh, and the crucible at the bottom for holding the copper of a large quantity of slag until it shall accumulate in sufficient quantities to make it desirable to cast it.

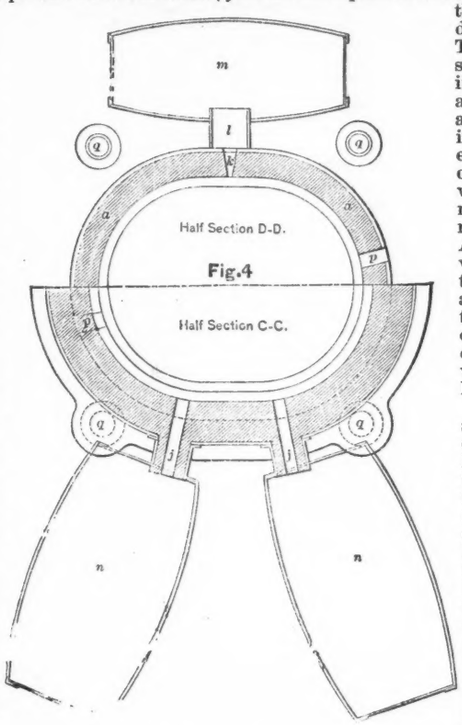


Fig.4

The cupolas are charged with slag, anthracite, and limestone, the latter being crushed in a Blake's crusher. It is brought from Kelly's Island, in Lake Erie, and costs 60 cents a ton for transportation. The anthracite comes from Sugar Loaf Mountain, does not decrepitate in the furnace, and is of good quality. The slag, anthracite, and limestone are brought to the top of the cupolas on the inclined plane in a wagon which swings on a pivot, where it is transferred to the little truck, and is rolled to the place where it is to be discharged. The wagon without the truck is rolled upon the platform behind the cupola, turned in the necessary direction, and dumped on either side, so that the supply for two adjoining bins comes from the same platform. The flux is discharged to the right, and the slag to the left hand of the charge. The coal is discharged at the end of the platform directly in front, and against the furnace, but away from the charging-door. The regular charge consists at first of 60 shovelfuls of coal, 100 of slag, and 40 of lime; after this, the charge is 40 shovelfuls of coal, 100 of slag, and 40 of lime; or for each ton of slag, 700 shovelfuls of coal, and 800 to 900 of lime. If the charge of slag is 20 tons, this will make 7 tons of coal and 8 or 9 tons of lime. The usual consumption of coal is between 6 and 7 tons. Besides the regular charge, scraps of copper and refuse to the amount of one half a ton are put in. The blast used is produced by a No. 5½ Baker's rotary pressure blower. The pressure is 17 inches of water.

Each furnace treats 18 to 20 tons of slag in about ten hours. One man does all the charging for one furnace. Below there are two men, one of whom breaks up the slag, and one takes charge of the copper. After a ten hours' run, the furnace must be repaired before it is used again. There is so much iron in the slag that the bricks in the lower part of the cupola are cut into about three inches, so that it would only be possible for the furnace to run a few hours longer than it does. In making ordinary repairs, the bricks are plastered over with mortar. Every three months, all the bricks below the water-back must be taken out. Above this point, except replacing a few bricks in front, the furnaces last five years without repairs. About ten thousand fire-bricks are required per year for the repairs to the three furnaces. When a cupola has been lined throughout, it must be allowed to stand a few days, to get rid of as much moisture as possible. The hearth of the crucible consists of river-sand, closely beaten down, and is from 5 to 6 inches in thickness. This bottom is taken out after each operation, as it is very rich in copper, and now goes back into the cupola furnace. It is charged with scrap rich in iron, and is very easily melted. It was formerly used in the charge in the reverberatory furnace. The water-bosh requires 25 gallons of water per minute, and is so regulated that the water running out of it is very near the boiling-point. Advantage is taken of this discharge-water in winter to keep the pipes from freezing. For this purpose, the supply-pipe, which is one and a quarter inches in diameter, is run through the center of an iron pipe three inches in diameter. The hot water from the water-bosh discharges into one end of this pipe in the winter and is discharged at the other, thus keeping the supply from freezing.

The men at the furnace are, one charger, one slag-man, one copper-man, four men at the cars, two men with the teams, and one at the Blake's crushers, who is occupied part of the time in crushing old fire-brick for the manufacture of the brick and grouting used in the repair of the furnaces. The slag flows continuously, and discharges from the slag-spout (*j*, Figs. 1, 2, and 3) into a basin *n*, made of sheet-iron and filled with sand (Figs. 3 and 4), which is placed on a heap of old slag, so as to leave the top just under the capital of the iron columns supporting the cupola. There are two of these slag basins, but only one of them is used at a time. They are oval in shape, with the ends cut off, and are 6 feet 6 inches long, 3 feet 6 inches wide in the middle, and 2 feet 9 inches at the ends. The slag flows slowly through this basin, where any copper, mechanically carried off, will be collected, and then runs over the opposite edge to the waste-pile. These slags, which are much more fusible than they were before the cupola treatment, owing to the addition of the flux, should be very poor. I was not allowed to take any samples for analysis during my different visits to the two works, nor have I been able to obtain any since 1869; but they are said to contain as low as 0·25 per cent. If they contain more than 0·75 per cent, they are re-treated. From 29 to 30 tons of slag are made from each operation.

Fig.3

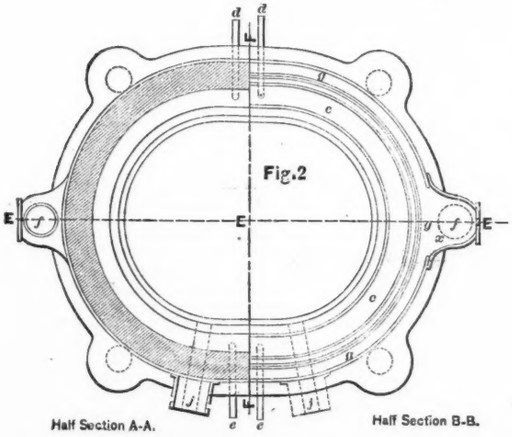
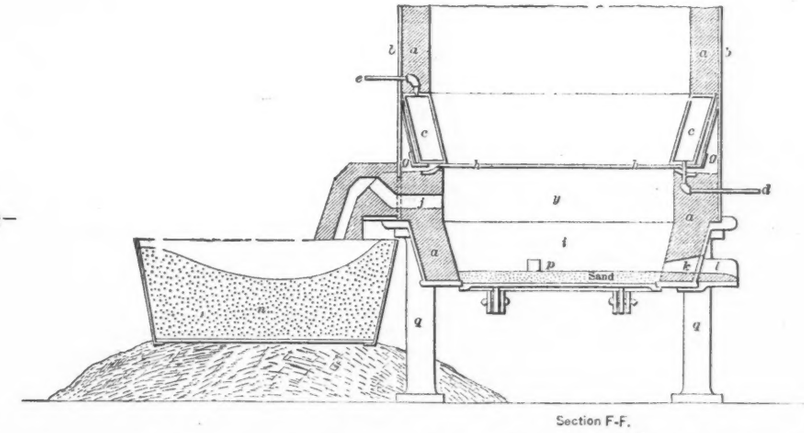


Fig.2



The copper in the slags, which is in the state of oxide, is reduced by the action of the gases in the furnace; the copper in grains settles, as soon as the slag is melted, to the bottom of the crucible. It is so deep that there is little fear of any amount of the copper being carried off in the slag as grains, the construction of the slag-discharge being such as to prevent it as far as possible. If any should flow off, it will be caught in the sump through which the slag flows. There is generally from thirty to one hundred pounds of it caught here. Sometimes a cake thirteen inches in diameter and two to three inches thick is made; sometimes a flatter cake of much larger size and weight, depending on the fluidity of the slag.

At the close of the day, when the entire charge has run through, the copper will be ready to cast. The casting-spout (*l*, Figs. 3 and 4) is made of iron, bolted upon the mantel of the furnace.

From a ten hours' run, 1800 to 2400 pounds of pig-copper are produced, which goes to the refining furnace, and is treated with the ore.

At Pittsburg, the slags when cool are picked and separated into rich or foul slags and poor slags. The foul slags, which are produced after the

complete fusion of the copper, go immediately to treatment in the reverberatory furnace, and the poor, which are produced during the melting, to the cupola. The reverberatory slag-furnace is of the same size as the ore-furnace, but the hearth slopes to the side instead of to the end. On the sides of the fireplace, there are openings left, to admit all the air required for the oxidation of the blister copper. The slags are allowed to accumulate until the supply of ore ceases, which it does in Pittsburg in the winter time, and are then all worked at one time. If there were more furnaces there, they would be smelted continuously. The product resulting from this operation is a pig-copper, which is treated as an ore with the ores. A very foul slag results, which will contain as high as 10 or 12 per cent of copper, which is put back as a flux in the same furnace. To treat the slag, three tons are charged at a time. It takes seven to eight hours to melt this amount. Another three tons is put in, and so on, and this is continued for two or three days. When enough blister copper has accumulated in the bottom of the furnace to cast, it is run out into three "pairs of pigs," by which three pigs are meant. Every two hours, the slag is run off the top of the charge. This slag contains 4 to 5 per cent of copper, and goes to the cupola furnace. The quantity of fuel required is three tons of coal for nine tons of slag, the ton being counted as 2000 pounds. Twelve per cent of this is 240 pounds of black copper, so that it must be allowed to accumulate in the furnace for a considerable length of time to make three to five tons when it is cast. If, when the slags are withdrawn, the melted copper is not sufficiently blistered, the doors are opened, and it is allowed to oxidize. This furnace requires one melter and one helper in twenty-four hours.

The clean slag from the copper smelting and all that comes from the reverberatory furnace go to the cupola. The following is a sample of the slags sent to the cupola at Pittsburg:

MECHANICAL ANALYSIS.

Metallic copper	0·22
Siftings	99·78
	100·00

ANALYSIS OF THE SIFTINGS.

Protoxide of iron	10·53
Copper	5·44
Oxygen with copper	1·37
Oxide of zinc	0·43
Oxide of nickel	0·08
Oxide of manganese	0·12
Alumina	15·36
Lime	11·81
Magnesia	2·57
Silica	49·83
	97·54

The cupola furnace is of the ordinary kind, and stands on iron pillars 30 inches from the ground. From the platform above the pillars, it is 10 feet high. It is 3 feet in diameter throughout. The three tuyeres are on the same level, and are 18 inches above the bottom of the furnace. These tuyeres are not equally spaced around the furnaces; two are at 18 inches and the third at 26 inches from these, so as to prevent a counter action of the blast. The space below the tuyeres forms the crucible. There is no crucible proper, as in the furnaces at Hancock. The bottom is closed with iron doors, and is held in place when the furnace is in blast by an iron bar. The pressure of the blast is 12 inches of water.

The charge of the cupola is simply coke and slag; occasionally a little lime is added, but this is not generally done. The iron and the sulphur in the coke make the resulting pig metal very hard, and there is frequently sufficient sulphur in the coke to form a small quantity of thin matte, which runs out on top of the blister copper. The furnace is run twelve hours at a time for six weeks without repair. It is always allowed to cool overnight. The tap-hole is always open, and the melted material is allowed to run from it continuously. The copper and slag together are caught in the casting-bed; as it is quite long and deep, the copper has time to settle at the bottom. The excess of slag flows over the slag-spout, and for convenience of transportation is caught in a cast-iron slag-wagon, which is 18 by 28 inches on the top, and 12 by 20 inches on the bottom, and 10 inches deep.

The copper is collected as a mass from the bottom of the casting-bed at the end of a run. From 700 to 1000 pounds are got at a tapping, with the expenditure of 50 bushels of coke (each bushel weighing 40 pounds), and the labor of four men, who do all the work of the furnace. This black copper is allowed to accumulate, and is treated by itself in the slag-reverberatory furnace for blister copper. The slags which come from the cupola are always poor. If there were any rich slags, they would be put back at once into the cupola. The metal from the cupola, although it contains but very little sulphur, is called a matte, or white metal. An examination of it showed that it was composed of 8·86 per cent of metallic copper, and 91·14 per cent of a matte containing 60·23 per cent of copper. This matte is charged in the reverberatory furnace, and treated for blister or pig-copper. Five tons are charged in the furnace twice a day, and are roasted for about eleven hours. As soon as melted, it is skimmed and cast as bell-metal. It contains more copper than white metal, and is metallic on the bottom, and nearly white on the top. In the twenty-four hours, the 10 tons of white metal gave 4½ tons of bell-metal. The slags, if rich, are put directly back into the furnace, but all poor slags go to the cupola and are treated there. When about 20 tons of bell-metal have accumulated, it is treated for blister copper. Five tons are charged, roasted as before, and about the same quantity of blister is made.

Utilizing Charcoal Dust.—A new method of utilizing charcoal dust which is now tried on a practical scale in the charcoal iron-furnaces of the Gere Iron and Mining Company, is worthy of the attention of smelters in those parts of the Rocky Mountain States where inferior charcoal must be used as a fuel. It is made by Mr. J. A. Mathieu, and is produced by mixing charcoal dust, sawdust, and tar, and submitting the mixture to heat in retorts. The braize is obtained from the pile of screenings which have in years accumulated about the blast-furnace, partly from kiln-made coal and partly from meiler-made coal. The tar is one of the by-products obtained from carbonizing wood in retorts. Mr. John Birkinbine, Secretary of the United States Association of Charcoal Iron-Workers, says that the fuel is remarkably hard and resonant, and from appearances it seems that it solves the problem of utilizing the large amount of waste accumulating constantly about our charcoal iron-works as braize.

THE NEW MEXICO COPPER INTERESTS.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Your issue of April 8th contains an editorial indexed under "Russia's Copper Craze," and which begins, "Russia, too, has had its copper craze," and which essentially and overtly is intended as a conservative warning against a "New Mexican Copper Craze." Intimately connected as I am with the interests of the copper industry of New Mexico, I may be permitted to take exception to the erroneous statements contained in your editorial.

1. The copper ore deposits which, by your statement, gave rise to some wild speculation and heavy losses in Russia are *not similar*, as you stated, to the copper ore deposits in New Mexico, as all the copper ore deposits in New Mexico, for which, up to the present date, any public interest has been claimed, are absolutely and entirely different from them geologically, as well as in all economically important features and conditions.

2. The experience had in Russia is no analogy, and is not applicable to the facts and conditions existing in New Mexico.

3. The failure of the present first attempt in utilizing the Russian deposit is no proof against the economical value of the Russian deposits, but plainly a proof only of incompetent management.

With regard to the Russian deposits you state: "It appears that certain members of the Permian formation of Southern Russia are quite extensively *impregnated* with small quantities of copper ores." In New Mexico, the Permian formation is known as yet only in one locality (Abo Pass and vicinity), but what copper ore there occurs has as yet not been considered or represented by any one claiming authority in such matters as of economical value; hence, there is no danger of a craze in this direction, and no cause for your warning. Besides this, the Abo Permian deposits are not in sandstone, to which you refer, but in bituminous slate and zechstein, as the Mansfeld copper mines are, which have been worked with economical success for nearly a century, notwithstanding that in the great aggregate they certain no more in value than the Russian deposits.

You further state, "The rock is sandstone, and the deposit of copper appears to be dependent upon the presence of organic remains." Thereby it becomes evident that your conservative warning against a New Mexico copper craze is specially intended against such deposits as consist in sandstone, with such copper ore the occurrence of which appears dependent on the presence of organic matter, and as of this class only the surface deposits in the Nacimiento Mountains are apt to create a craze, your warning must be understood to be specially directed against the Nacimiento Copper Company, which controls these deposits.

Having been the first to direct the attention of your readers to this deposit and to its important economical value, in your issues of August 7th and 14th, 1880, of which you were kind enough to state in your issue of September 4th, 1880, "The article, New Mexico *vs.* Lake Superior as a Copper Producer, by F. M. F. Cazin, which appeared in our issues of August 7th and 14th, was written expressly for the ENGINEERING AND MINING JOURNAL," I consider it my duty not to let the correctness of my statement be questioned without proper elucidation of the real facts. I, therefore, will show in what the Russian and New Mexican (Nacimiento) copper ore deposits differ. The question at issue at present being essentially as to the economical value of the copper ore deposits in New Mexico, I may pass over the connected geological points hurriedly. Those who desire to refresh their memory on the subject may be referred to the issues of this JOURNAL of August 7th and 14th, 1880, page 87, etc.; October 23d, 1880, page 269; December 11th, 1880, page 381; January 1st, 1881, page 4; April 30th, 1881, page 300; also Transactions of the New York Academy of Sciences, 1880 and 1881, pages 15 and 20.

The question of the origin of copper and of the manner in which it was deposited has been thoroughly discussed in a paper written by A. W. Jackson, and printed in the Report of the Director of the Mint, Horatio C. Burchard, March 2d, 1881, pages 384–393.

Admitting that the Nacimiento deposit is of Triassic, and of neither Permian nor Cretaceous age, the economical side of the question deserves a closer scrutiny. Of the Russian ore deposit you state:

1. That the sandstone is impregnated with ore, and that it runs on test 0·9 per cent of copper.

2. That seven Rachette furnaces were constructed, and smelted the sandstone of such contents, and that the conclusion then was reached that the enterprise would not pay.

As a matter of comparison, I may state that at Nacimiento the ore intended to be smelted is *not impregnated sand-rock*, but the ore there consists of the mineral called copper glance, assaying 40 per cent in the great average, and occurring imbedded, and not impregnated in the sand-rock, so that the sand-rock remains on the dumps of the quarries, and the ore is received at the furnaces, not with 0·9 per cent of copper, as in Russia, but with contents of from 7 per cent to 44 per cent of copper, and on an average of not less than 35 per cent, in proof of which I offer a car-load for inspection, if the JOURNAL will pay the freight East.

Of the Nacimiento deposits, Prof. J. S. Newberry, from his own observations, stated: "In the coarse yellow sandstones and conglomerates, I find large quantities of the sulphide of copper replacing trunks and branches of trees." (Report on the Exploring Expedition under J. N. M., page 117.) From my personal observation, I may state that this is an absolutely correct description, as I have seen and handled copper glance assaying 44 per cent of copper, being cuprifacts of leaves, limbs, branches, and trunks of trees in pieces measuring from half an inch to 18 inches in diameter, and weighing from a few ounces to several tons. It does not appear that this might be properly called, as you intended it should, an impregnation of the sand-rock. We have in place thereof two distinct minerals, the one sand-rock and the other copper glance. No one has at any time proposed to smelt sand-rock at Nacimiento, carrying, as the Russian sand-rock does, 0·9 per cent of copper; but the intention about to be carried out has been and is to quarry the sand-rock (no underground work is required, the rock being on the surface), and to select from the crumbling rock the dark-colored, harder, and heavier ore, and to smelt an ore of from 20 per cent to 35 per cent of copper impregnations.

Economically, the point in this case is the quality of the sand-rock more than its aggregate percentage in copper; because, unless the rock be soft and crumbly, facilitating an easy and cheap separation from it of the ore

proper, there might be some doubts as to the economical results of working it. Permit me to quote with regard thereto an opinion expressed by Dr. E. D. Peters, Jr., M.E., present superintendent of the Orford Copper-Furnaces at Bergen Point, N. J., in a letter to his employers, who sent this gentleman to New Mexico for the purpose of ascertaining the correctness of previous reports made to them. Dr. Peters stated: "No one can look at a wall of sandstone covering a number of square miles and filled with petrifacts of copper glance often altered into red oxide, malachite, and azurite, and again only stained, and form any estimate of what profits can be made by running it. At the first claim I visited, I could scarcely see any thing, and yet in fifteen minutes' grubbing with a pick I unearthed what I estimated to be equal to 12 pounds of metallic copper. My impression is, that the petrifacts will pay largely, owing to the wonderful facility with which the rock blasts (one 10-foot hole ought to throw down 50 tons) and the ease with which it breaks up and separates from the petrifacts. I think three good quarrymen could keep 30 or 40 men picking the ore, breaking up sandstone fragments, and tramming the waste rock over the dump, for which latter there is ample room and fall. But I attach much importance to the lower grade of carbonate ores, which exist in far larger quantities, and consist of sandstone streaks; crusts surrounding each petrifact and isolated masses, running from half carbonate of copper down to a mere stain. Only steady work for a given length of time with careful data as to production can determine *absolutely how profitable these mines can be made. My impression is, that the profit would be enormous.* All the claims I visited (five or six) presented the same characteristics. I think with two men I could pick up several hundred (or thousand) dollars worth of loose petrifacts on the first claim I visited, which lie imbedded in the soil and *débris* covering the sandstone, this layer being from a few inches to several feet deep. I think the size and thickness of this sandstone layer is correctly given in Cazin's report."

If Dr. Peters attaches more importance to the carbonate ores than I have expressed, he refers to a second class of ores, the utilization of which may remain an open question; while, as to the utilization of the cuprifacts with excellent economical results, there can be no doubt with those correctly informed of the facts.

With all this, Professor Newberry's opinion is perfectly correct, as it was expressed before the New York Academy of Sciences, in its session of October 31st, 1881: "The aggregate quality of copper in this formation is enormous, but except where by the erosion of the beds it accumulated at the surface and could be picked up without any expense in mining, it would hardly pay to attempt to obtain it by ordinary mining processes."

But just these exceptional favorable conditions of accumulation consequent on erosion and of avoiding ordinary mining processes do exist at Nacimiento. As to the accumulations consequent on erosion, I may quote again from Dr. Peters's report:

"For an area of 20 or 30 square miles, the country seems covered here and there with petrifacts of copper glance. I never saw so much rich copper ore before."

As to the manner of obtaining the ore, it has in no instance been claimed by me or any one else that the ore at Nacimiento might be obtained by "mining processes," and then be worked with profit. There is no need for such mining processess as shafting, tunneling, and stoping, because the ore is exposed above ground in high cliffs, and *is quarried and not mined.* With regard to the cost of thus obtaining and reducing ore, I refer to your own JOURNAL, Vol. XXIII., pp. 120, 136, 168, and Vol. XXX., p. 87, etc.

It appears by these carefully-collected data that sand-rock is treated and metal therefrom obtained at Mechernich under conditions essentially less favorable than at Nacimiento, at a cost per ton (2000 pounds) of less than 40·55 cents, because the product per ton amounted to so much, and a margin of profit was obtained, amounting to 1,556,345.53 marks in 1879, and such profit has since continued or increased. With all this, the Nacimiento rock contains, by the very lowest estimates ever attempted, five times the value per ton of what the Mechernich rock produces, and by other estimates up to twenty times such value in the great average.

The essential conditions to these results obtained at Mechernich are: 1, that the sand-rock be pliable; and 2, that by mechanical separation the metallic mineral may be concentrated from the sand-rock. Both these conditions are fulfilled at Nacimiento. But while at Mechernich, all the rock has to be mechanically treated by machinery, the metallic ore occurring in such fine particles, there is no such necessity at Nacimiento, the ore occurring in hard, easily and automatically separating lumps of more or less considerable size.

This is correct for the cuprifacts, and correct also for what concretions with copper occur besides the main ore or cuprifacts, because these concretions also are local and no general impregnations. They are harder than the sand-rock, and can be obtained separately by hand-picking as easily as the richer cuprifacts can. Should there be any difficulty in future, yet not experienced, in collecting the smallest, say half-inch, particles of cuprifacts, simple jigging would recover them at very low expense, there being no necessity for thus breaking all the rock. The essential difference between the Russian rock and the rock at Nacimiento consists in the Russian rock being all smelted in Rachette furnaces; while the Nacimiento rock remains on the quarry dumps, with the exception of the high-grade ore proper, which alone is carried to the furnaces and smelted. The Russians would evidently have obtained better results by lixiviation than by smelting. These essential points of difference may be summarized as follows: The Russian failure is in itself not an exhaustive proof of the economical possibilities even in treating their rock impregnated with 0·9 per cent of copper, but it has no analogy with economical results obtainable with soft crumbly sand-rock containing hard lumps of 44 per cent copper glance, such rock being on the surface and in exceptionally favorable location with regard to fall and labor.

New Mexico gives fair promise that, notwithstanding conflicting interests and ill-advised warnings, it will step into line as a large copper-producer within a very short time.

F. M. F. CAZIN.

NEW YORK, April 8.

ACCORDING to dispatches received here, the Bessemer works at South Pueblo, Colo., have made a successful trial run.

PROGRESS IN SCIENCE AND THE ARTS.

A New Explosive.—*Glückauf* reports that some of the Westphalian mines which suffer from poor ventilation are beginning to introduce a new explosive manufactured at Düren, and called "nitrited gun-cotton." It is said to be as powerful as dynamite, without producing any obnoxious gases.

A Use for Liquid Carbonic Acid.—Krupp, the great gun manufacturer, is said to be employing at his works a very ingenious way of recovering the coils of guns which have become useless. He heats the barrel to redness and then introduces liquid carbonic acid. The cold thus produced causes shrinkage and allows the coils to be removed.

Resistance to Traction on Streets and Roads.—Mr. Rudolph Hering, President of the Engineers' Club of Philadelphia, has compiled a few figures on the resistance to traction on streets and roads which are valuable for reference. Resistance varies nearly as the weight, being great for heavy loads and almost nothing for light pleasure carriages. It increases on paved streets with the velocity, and as the diameter of the wheels becomes less. The width of tire has little influence on hard and smooth roads, especially for light loads, while it has considerable influence on soft and rough roads, particularly when the load is heavy. The most economical conditions for traction, therefore, are a hard and smooth surface, large wheels, and broad tires; the latter for heavy loads drawn on rough roads. To draw a load on sand requires a power equal to $\frac{1}{4}$ of its weight, on ordinary earth $\frac{1}{16}$, on hard clay $\frac{1}{26}$, on ordinary cobble stones $\frac{1}{46}$, on good cobble pavements $\frac{1}{80}$, on ordinary Belgian blocks $\frac{1}{120}$, on London blocks $\frac{1}{622}$, on asphalt $\frac{1}{1344}$, and on iron rails $\frac{1}{2000}$ of the load. The economy in horse-power obtained by using the hardest and smoothest roads is clearly shown. If one horse can just draw a load, on a level, over iron rails, it will take $1\frac{1}{2}$ horses to draw it over asphalt, $3\frac{1}{2}$ over the Belgian, 5 over ordinary Belgian, 7 over a good cobble-stone, 13 over a bad cobble-stone, 20 over an ordinary earth road, and 40 over a sandy road.

THE Phœnixville Iron Company is introducing mechanical puddling-furnaces.

LAND COMMISSIONER ABRAMS, of the Texas & Pacific Railroad, has been authorized to lease the mineral lands of the company at about 30 per cent of the product, and on the conditional opening and continual working of the mines by the lessees.

THE Cincinnati Board of Trade held a meeting recently to consider the matter of strikes and lock-outs by the workmen in various industries, and resolved to appoint an arbitration committee, to be composed of five prominent citizens, to settle matters of wages and other points of difference between employers and employés.

THE manufacture of high-grade ferro-manganese so long confined almost exclusively to the St. Louis Works, at Marseilles, France, has been started at Pyle, Glamorganshire, Wales, where metal running 84 per cent is produced. This adds another one to the consumers of our Southern and Canadian high-grade manganese ores.

MESSRS. H. S. HOWLAND, of Toronto; T. Guilford Smith and George Beals, of the Union Iron-Works, of Buffalo; C. J. Pusey, of Madoc; N. Lilienberg, of New York, a well-known Swedish metallurgist; and W. Hamilton Merritt, of Toronto, mining engineer, have visited the chief mines of the Victoria County iron region, Canada. The inspection was with a view of considering the desirability of establishing charcoal iron smelting-works in this locality.

GENERAL MINING NEWS.

ARIZONA.

A railroad from Deming to Silver City has been pledged by the first of next October. Ground will be broken by the first of May. The length of road will be forty-five miles.

OLD DOMINION.—It is officially announced that the following improvements have been made at the furnace-site. Two thirty-ton water-jacket smelting-furnaces, with engines, boilers, rock-breakers, Baker blowers, and water-tanks. A complete set of steam hoisting-works has been erected on the New York mine. The following buildings have been erected: An assay office, a boarding-house for employés, a house and office for superintendent. Other improvements completed are a railroad 1400 feet long from the mouth of the New York tunnel to the smelting-furnaces; a graded road three miles long from the smelting-furnaces to the charcoal-pits; and a graded road from the Old Dominion mine to the main road. Ore-bins have been built at the Old Dominion and Keystone mines. Tracks have been laid-in the New York, Old Dominion, and Keystone mines, and equipped with ore-cars.

GLOBE DISTRICT.

The *Silver Belt* of the 1st inst. says: The works of the old Globe Copper Mining Company are in such a state of forwardness as to warrant the belief that the company will soon begin smelting. The difficulty at the Old Dominion smelter, as represented to us by Mr. White, is in the inferiority of the coke, which, in consequence of slate, fails to generate sufficient heat; this, however, will soon be remedied by the receipt of English coke, which is known to be free from extraneous matter, and which it is intended to mix with the Trinidad coke now on hand at the smelter. We are looking with considerable interest to the successful working of copper ore in this district, which, from present indications, seems to be most abundant. The silver ledges are giving flattering results, and at no time in the history of the camp have they shown better than now. The Buffalo Mining Company is only awaiting the arrival of a water-jacket from San Francisco for its smelter, which is expected to arrive in Globe within a very few days, to enable the company to commence operations at the furnaces. Its mine is yielding large quantities of good ore.

TOMBSTONE DISTRICT.

The most important development to record for the week ended the 1st inst. is the striking of water in the Grand Central main shaft, about 18 feet below where water was first discovered. It is believed that the permanent water region has been reached, and the developments below this point are awaited with considerable interest. The water has necessitated the stoppage of the sinking of the main shaft, in which there are now 18 feet of water. An uprise has been started on the 300 level, which are now up 30 feet, and also a winze, which is down 10 feet. The rest of the mines are looking as usual, and shipping the same amount of ore.

CALIFORNIA.

THE BODIE DISTRICT.

There is nothing especially interesting reported concerning the mines of this district, other than the recent strikes in Bodie Consolidated, Standard Consolidated, and Noonday, which are undergoing further development. A Bodie dispatch, dated April 11th, says: The Standard Consolidated shaft is now down 1210 feet. The east cross-cut, 1000 level, is in 672 feet, and the south drift from the same is in 99 feet. Bodie Consolidated has resumed sinking the Lent shaft. During the past week, Bodie crushed 114 tons of ore; average pulp-assays, $70. Bullion shipped, $10,390. The winze on the rich vein is down 27 feet, and the drift is 128 feet long, without diminution in quantity or deterioration in quality of ore.

COLORADO.

From all sections of the State, reports received indicate that the coming season will be the liveliest in mining operations ever recorded in the history of Colorado. Not only are the Leadville and other mining districts flourishing; but, throughout the State, innumerable small camps are springing up, many of which, it is expected, will be heard from before the end of the year. Of course, active mining operations, in many places, will be retarded for a time yet by the snow; but preparations are making to resume work as soon as the weather will permit, on claims that have long lain idle.

GILPIN COUNTY.

BOBTAIL.—A report that the Bobtail Gold Mining Company contemplated stopping all work is stated by the local papers to be entirely untrue. The company will raise its pumps, and for the present confine its operations to the exploration of veins tributary to the Bobtail from the tunnel level. It will also drive the level west from the tunnel level. The 125-stamp mill is well supplied with ore.

GUNNISON COUNTY.

The developments in the Forest Queen show the recent strike to be fully up to expectations. The width of the vein in the lower levels is reported to be from fifteen to sixteen feet. There is nothing new reported from the other mines in the vicinity of Irwin.

LAKE COUNTY.

The report of the smelters for the quarter ended March 31st is a gratifying one, showing the aggregate product to have been $4,031,433, as against $3,097,820 for the same time last year—an increase of nearly one million dollars thus far this year. This shipment is the largest ever made by the mines during the same length of time; and as the smelters have large quantities of ore on hand, and the mines are increasing their output, it may be taken as an indication that the product of the Leadville mines for 1882 will largely exceed that of any previous year. The mines are in good condition, and the shipments large and steady.

Fryer Hill, in particular, is actively and thoroughly worked, although no new developments are reported this week. The Little Pittsburg has started shaft No. 9, which, it is expected, will cut the ore-chute recently encountered in Amie. When the shaft reaches the level of the Amie strike, a diamond drill will be used to determine whether the recent developments made in Chrysolite extend into Little Pittsburg ground. Amie is still shipping ore from the recent strike, which is said to hold good. The total shipments from the mine since the strike have yielded nearly $15,000. Little Chief continues about the same; the shipments last month netted barely enough to pay the expenses of the mine. Climax continues shipping small lots of ore, principally by lessees. Considerable high-grade ore from the Robert E. Lee is shipped to the works at Golden, in addition to the regular shipments to the Leadville smelters.

The Carbonate Hill mines are shipping a good deal of ore, which is generally of a higher grade than formerly.

On Breece Hill, the Breece Iron mine is shipping less ore than usual, on account of the limited demand for iron ore.

CARBONATE HILL.—This mine is the property of the Leadville Consolidated Company, and located on Carbonate Hill. Recently, the Leadville *Democrat* reporter made an examination of the workings, and found that a considerable amount of work had been done during the last two months. The second level, from which a winze was sunk for a short distance into the ore-body, has now developed into a large deposit of a very handsome lead carbonate that carries a considerable amount of silver, some very high assays having been returned. A force of men is now employed at this point, getting out ore, which is facilitated by the connections that have been made for this purpose; this ground is on the north side of the main incline. On the south, between the third and fourth, the ore-body that was discovered under the main incline is tolerably well developed, and shows a somewhat extensive ore-chute that is located in a hollow, or what appears to be a trough in the lime. Some excellent ore is taken out of a small stope already opened up. The ore is mostly a hard carbonate, and specimens broken off from the main mass of ore show a good deal of chloride. In the tenth level, south of the main incline, some prospecting is done on the ore-body, from which also ore is shipped to the surface. The ore appears to be about 18 inches in thickness, and runs high in silver and lead, some excellent sand carbonates being taken out with the general mass. The combination incline of the Carbonate mine is located near the south end of the property. A little to the north end of this incline, an ore-body has recently been struck that gives very high returns in silver, being mostly a light, yellow-covered ore that carries but little lead. The mineral has now been followed for about 100 feet, and still shows no signs of pinching out; on the contrary, the ore-deposit looks strong and permanent. A cross-cut level is now running from the main incline, and only a short distance has to be run toward the present workings in the ore-body. Preparations are making to start work on the south incline of the Carbonate mine.

SAN JUAN COUNTRY.

GRAND VIEW.—This company is about to erect concentration-works to treat its low-grade ores. New roasters are to be built. The concentrators are expected to reduce about 50 tons of ore a day.

MISCELLANEOUS.

Eleven of twenty mine prospectors, who recently left Durango for a tour in the Navajo Mountains, have returned to Durango, and report that no valuable mineral discoveries were made, except in the bed of the Colorado River, where they found placer gold that showed forty colors to the pan, which might be made to pay from $5 to $6 to the man. But these placers could not be worked except at times when the river is low, as at present. A month later, the river will doubtless cover it. Lincoln, one of the oldest placer mining camps in Colorado, is still the scene of active mining operations. A number of miners are working in French Gulch, and doing well. One of the localities that is expected to show up well during the coming season is North Park. The country is said to contain extensive coal lands and soda beds; and there are already many claims from which rich gold and silver ore is extracted. One of the principal mines is the Endomile, which has a tunnel in 250 feet, and a shaft that is down 125 feet below the surface. Quartz of a fine grade is found both in the tunnel and the shaft. Hoisting-works will probably be erected before July 1st. One of the promising mining camps tributary to Leadville is Taylor Hill. It is just over the divide on the way to Red Cliff, and 12 or 13 miles from Leadville—that is, about midway between there and Red Cliff. The camp is reached after about a mile's descent from the summit of Tennessee Pass. The mines are about half a mile from the railroad, and most of them not far from the bottom of the hill. They are easy of access. Some of the mines, upon very little development, are making very rich showings.

MICHIGAN.

We give below figures obtained from the Portage Lake *Mining Gazette*, showing the yield of the principal Lake copper mines for March:

	Tons.	Lbs.
Calumet & Hecla	1,825	440
Atlantic	151	435
Franklin	150	480
Allouez	101	695
Pewabic	73	525
Grand Portage	38	476

A Milwaukee dispatch says that information has been received by the officials of the Milwaukee & Northern Railroad that the State Board of Control of Michigan has ordered the Marquette, Houghton & Ontonagon Railroad to extend its line westward to connect with the eastern terminus of the Ontonagon & Brule River Railroad, twenty miles from Ontonagon.

MONTANA.

All the important mines in the vicinity of Butte are in active operation, pushing underground developments, and in making surface improvements. Elsewhere we publish an official letter from the Alice, showing the latest developments in that and the Magna Charta mine. The Moulton mill is running steadily on ore from the Moulton, Goldsmith, and Morning Star mines. The mine is looking as usual, with the exception of the 200-foot level, where a chute of good ore has been encountered, which assays about 45 ounces.

NEVADA.

THE COMSTOCK LODE.

The north end mines are reported as looking unusually well, although nothing definite can be learned regarding them. The representatives of the south end mines are still trying to agree on some method of draining their mines, but have not thus far come to any conclusion.

COLUMBUS DISTRICT.

NORTHERN BELLE.—Report for the week ended April 1st, says: The general appearance of the shaft-levels is very much the same as last week, except in the cross-cut on the second level, where there is considerable improvement. The adit and the levels above show very little change, but keep up the usual production of ore. The daily yield of ore has been about 50 tons. Bullion shipments for the week ended March 30th were $15,739.70; and a total of $53,847.72 on March account to the same date. One more shipment remains to be made on last month's account.

FINANCIAL.

Gold and Silver Stocks.

NEW YORK, Friday Evening, April 14.

The mining market this week has not developed any new features, with the exception, perhaps, of the Comstock shares, which have become more active and strong under the report of the ore-breasts looking better, and of a rich strike in one of the levels in Union Consolidated. San Francisco prices grew stronger, and as a matter of course, the market here for the Comstock shares grew strong in sympathy. Outside of this, there is nothing special to report. The Leadville stocks have fallen off some, and have not been as active as usual. The sales for this week on all the exchanges amount to 1,249,902, as against 957,087 last week. The market closed irregular and inclined to weakness.

The Leadville stocks have been quite active, but have shown some weakness. Amie was steady, selling at 28@38c., closing at 35c. Chrysolite was quite active, but showed considerable weakness, owing no doubt, to the small shipments made during the week. We understand that the company has $242,000 in the bank. There has been some trouble with the water in the Roberts shaft, requiring all the pumping capacity available. This, and the fact that in some parts the timbering is not sufficiently advanced, is believed to account for a falling off in the shipments of ore this week.

Dunkin was quiet and weak at 40@35c. Iron Silver was steady at $2.10@$2.20. Hibernia, with a moderate business, was steady at 15@10@12c. Little Chief was weak, selling from $1 on Saturday last to 90c. to-day.

The Bodie stocks were quiet and about steady. Bodie was strong, selling from $5⅝@$5⅞. Bulwer was very quiet, and sold at $2.20. Boston Consolidated, with sales of 6900 shares, was quoted at 20@25c.

The Comstock shares had a fair business at stronger prices. California had a fair business at 10@20@16c. Consolidated Virginia was active and strong, selling from 40@82c., closing at 70c. to-day. Sierra Nevada, with a moderate business, developed considerable strength, selling from $5⅛@$10@$8⅛. Mexican was strong at $6½@$10¾@$8½. Sutro Tunnel had quite an active business, the sales amounting to 54,960 shares at 50@75@62c. Union Consolidated was very strong, selling from $9½@$17½, and closing at $13¾.

The Tuscarora stocks were very quiet, Navajo being the only one worthy of notice. It sold from $1@80c., with sales of 4300 shares.

Robinson Consolidated still continues to be very active, the sales amounting to 103,800 shares. The reports from the mine still say that every thing is looking "all right," and the 1000 foot level is yielding rich ore. The price of the stock, however, is low, and fluctuates with the market. On Saturday last, it sold at $3.35, on Wednesday at $3.60, and to-day closed at $3.25. South Pacific also continues to be one of the features of the market, the sales aggregating 218,750 shares. The price has varied from $1.15@$1, closing at $1.05. The State Line stocks have been quite active, and No. 2 and 3 has gained a little strength. It sold at 42c. last Saturday, but, with great fluctuations, managed to reach 71c. to-day, and closed at 68c.

At the annual meeting of the American Mining Stock Exchange, held on April 11th, George W. Smiley was elected President; John R. Mullany, Chairman; and Henry M. Cowles, Secretary.

The Chicago Mining Exchange has been organized, and the following officers elected for the ensuing year: President, General G. R. Vernon; First Vice-President, Judge J. W. Finney; Secretary, E. M. Greene; Treasurer, E. E. Wood.

Mr. Bothwell, of Messrs. Clark & Bothwell, managers of the Stormont, Hite, Eagle, and other mines, states that the Hite has been a "great disappointment." We understand that the work done on it has been mainly development.

A telegram was received at the office of the Old

Dominion Copper Company this morning from Mr. Riotte, of Mathey & Riotte, of this city, who had been sent to the mine by the company, stating that hereafter the company would be able to use charcoal in its smelting-furnaces instead of English coke. This will be a considerable saving.

The annual meeting of the stockholders of the Silverton Mining Company was held at the office of the company, No. 206 Broadway, on the 7th inst. The following trustees were elected for the ensuing year: W. R. Walkley, M. C. Ogden, Peter McCartee, S. Havard Wilcox, O. P. Posey, N. S. Boardman, and L. V. Walkley. After the annual meeting, the trustees met and elected W. R. Walkley President; M. C. Ogden, Vice-President; S. H. Wilcox, Treasurer; W. E. Walkley, Secretary; O. P. Posey, Mining Superintendent; and J. W. Wirgate, Assistant Mining Superintendent.

The following companies have filed certificates of incorporation at Albany: Pocahontas Mining Company; capital, $1,000,000; Standard Copper Company, $500,000.

An assessment of $1 per share, payable May 1st, has been levied on the stock of the Silver Islet Consolidated Mining and Lands Company. President Strong states that this assessment had become necessary on account of the unproductive condition of the mine. He says that prospecting-work is prosecuted by the full force.

Annual meetings of the following companies will be held in this city on the dates mentioned: Evening Star, May 1st; Stirling, May 1st; Morning Star, May 1st; Rosicr Copper Company, April 19th.

DIVIDENDS.

The United Coal and Coke Company will pay the interest due April 1st, 1882, on its first mortgage bonds, upon presentation of the coupons at the office of the company, 58 South Third street, Philadelphia.

The Deadwood-Terra Mining Company, of Dakota, has declared its usual monthly dividend of 15 cents per share for March, payable on the 20th inst. Transfer-books close on the 15th.

The Northern Belle Mining Company, of Nevada, has declared its usual dividend.

The San Francisco Copper Company, of California, has declared its first dividend of 5 cents per share, or $250.

The Silver King Mining Company, of Arizona, has declared its usual dividend of 25 cents per share.

The Homestake Mining Company has declared a dividend (No. 44) of 40 cents per share, for the month, instead of 30 cents heretofore paid, payable on the 25th inst. Transfer-books close on the 20th.

UNLISTED QUOTATIONS.

	Bid.	Off'd.		Bid.	Off'd.
Colum. & Beav..	$0.40	$0.75	Inyo	....	$1.25
Eagle	.50	.80	Menlo	.50	.75
Hall-Anderson..	1.50	2.50	Santa Maria	2.50	3.00
Highland Chief.	....	1.45	Satemo	2.50	3.00
Hite	.50	.75			

SAN FRANCISCO MINING STOCK QUOTATIONS.

Daily Range of Prices for the Week.

NAME OF COMPANY.	CLOSING QUOTATIONS. April 7.	April 8.	April 10.	April 11.	April 12.	April 13.
Alpha	.....	7-16	½	19-32	¾	¾
Alta	2¾	2⅞	2¾	2⅞	2¾	5⅞
Bechtel	.....	¼	.....	.....	¼	.....
Belcher	7-16	.....	13-32	13-32	7-16	7-16
Best & Belcher	4⅞	5	5⅛	6⅛	6⅜	6¼
Bodie	5⅜	5¼	5⅝	5½	5½	5¾
Bullion	¼	3-16	¼	¼	¼	3-16
Bulwer	2¼	.....	2	2¼	.....	.....
California	.....	3-32	3-32	3-16	5-32	5-32
Challar	27-32	1	1	1⅛	1	1
Con. Virginia	7-16	21-32	19-32	21-32	21-32	¾
Crown Point	13-32	½	½	½	½	9-16
Eureka Con	21⅞	21¾	21⅝	21½	22½	22
Exchequer	¼	3-16	¼	5-16	5-16	¼
Gould & Curry	2⅜	2¼	2¼	3⅜	3⅛	3¼
Hale & Norcross	11-16	27-32	13-16	1	1¼	1¼
Manhattan	.....	.....	.....	.....	.....	1½
Martin White	4	.....	3¾	.....	4	4¾
Mexican	5⅝	6	6¼	9	7¾	8¼
Mono	1¼	1⅜	1½	1½	1½	.....
Mount Diablo	4¼	4¾	4½	.....	.....	4⅝
Navajo	29-32	15-16	29-32	29-32	15-16	.....
Northern Belle	8⅛	8¼	8¼	8⅝	8	8
Noonday	1	1¼	1¼	1	1	1¼
Ophir	3¼	3½	3⅜	5⅜	4⅝	4⅝
Ohio	11-32	5-16	3-16	13-32	13-32	5-16
Overman	¼	¼	¼	¼	5-16	5-16
Potosi	¾	27-32	13-16	1	27-32	27-32
Savage	1¾	1¼	1⅜	1½	1⅞	2
Scorpion	19-32	¾	13-16	1⅛	29-32	1
Sierra Nev	5⅝	6	5½	8⅝	7⅜	7⅝
Silver King	16½	17	.....	17	17	17
Tip Top	3⅜	3½	.....	.....	3¾	4
Union Con	9½	10	11¼	17¼	14¾	13⅛
Wales Con	9-16	9-16	9-16	19-32	9-16	.....
Yellow Jacket	15-16	1	1	1	1⅛	1
.....	.....	.....	.....	.....	.....	.....

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	SHARES. No. in 1000's	SHARES. Par Value.	ASSESSMENTS. Levied to date in 1000's.	ASSESSMENTS. Date and amount per share of last.	DIVIDENDS. Total paid to date in 1000's.	DIVIDENDS. Date and amount per share.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. April 8. H.	April 8. L.	April 10. H.	April 10. L.	April 11. H.	April 11. L.	April 12. H.	April 12. L.	April 13. H.	April 13. L.	April 14. H.	April 14. L.
Alice, Mon	400	25	*	.....	.....	40 De 81	10	3.00	.....	3.00	.....	.....	.....	.....	.....	.....	.....	.....
Amie Con., Co	500	10	*	.....	.....	900 My 81	10	.31	.28	.30	.28	.30	.28	.34	.30	.37	.35	.38	.28
Atlantic, Mich	40	—	.....	.....	.....	..... Fe 82	2 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Argenta, Ne	100	100	140	Se 81	10	40 Fe 80	20	.....	.....	.....	.....	.....	.....	.....	.....	.10	.....	.....	.....
Bar & Walker, Ut	100	10	*	.....	.....	6 No 80	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bassick, Co	100	100	*	.....	.....	25 Se 80	25	.....	.....	7.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belle Isle, Ne	100	100	55	Se 81	10	30 De 79	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Black Bear, Ca	30	100	15	Se 79	50	835 Mr 82	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Belcher, Ne	104	100	238	Se 81	1 00	16397 Ap 76	75	.....	.....	.....	.....	.49	.....	.....	.....	.....	.....	.....	.....
Bodie Cons., Ca	100	100	125	De 81	50	1200 Mr 80	25	.....	.....	.....	.....	5.38	.....	5.63	.....	5.63	5.50	5.88	5.75
Breese, Co	200	25	*	.....	.....	5 Fe 80	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bulwer, Ca	100	100	3	De 77	50	50 Ap 82	10	.....	.....	.....	.....	.....	.....	2.20	.....	.....	.....	.....	.....
Consolidated, Ne	540	100	378	Mr 82	20	3132 De 79	50	.11	.10	.15	.10	.13	.11	.20	.15	.17	.14	.16	.....
Cal. & Hecla, Mch	100	25	..	.....	.....	2 854 Fe 82	5 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caribou Con., Co	100	10	*	.....	.....	50 Mr 80	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Catalpa, Co	300	10	*	.....	.....	18 My 81	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crysolite, Co	200	50	*	.....	.....	1000 De 81	50	5.75	5.50	5.63	5.13	5.38	4.95	5.25	4.70	5.00	4.60	4.75	4.65
Climax, Co	200	10	*	.....	.....	180 Au 8	30	.....	.....	.....	.....	.39	.....	.27	.....	.....	.....	.30	.29
Cons. Va., Ne	540	100	735	Ja 82	30	42030 Au 80	50	.52	.46	.60	.53	.65	.61	.82	.70	.75	.70	.75	.70
Copper Kettle, N.C	1000	1	*	.....	.....	15 No 80	02	.03	.02	.....	.....	.02	.....	.02	.....	.02	.....	.....	.....
Copper Queen, Ar	250	10	*	.....	.....	275 Ap 82	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crown Point, Ne	200	100	2273	Se 81	75	1158 Ja 75	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
D'dw'd-Terra, Dk	200	25	*	.....	.....	1655 Ap 82	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dunkin, Co	200	25	*	.....	.....	200 Ju 81	7½	.40	.39	.40	.....	.40	.39	.38	.....	.....	.....	.35	.....
Eureka Cons., Ne	50	100	100	My 76	1 00	4730 Se 81	50	22.00	.....	.....	22.75	.....	22.00	22.00	22.88	22.00	22.75	22.00	22.63	22.13
Excelsior, Ca	100	100	300	Ja 82	1 00	850 Se 81	25	2⅜	.....	.....	.....	.....	.....	.....	.....	.....	.....	2 00	.....
Fa. de Smet, Dk	100	100	.....	.....	.....	390 Fe 82	25	.....	.....	.....	.....	.....	.....	6.25	.....	6.50	.....	5.00	.....
Findley, Ga	200	1	*	.....	.....	0 My 79	10	.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Freeland, Co	200	25	*	.....	.....	50 Ly 81	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Glass-Pend. Co	250	20	*	.....	.....	25 My 81	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold Stripe, Ca	150	10	*	.....	.....	76 Jy 81	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gould & Curry, Ne	108	100	2368	Ja 82	50	3826 Oc 70	80	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Grand Prize, Ne	100	100	240	Oc 81	25	450 Se 80	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Great Eastern, Dk	300	1	*	.....	.....	10 Jy 8	01	.....	.....	.....	.....	.....	.....	.08	.....	.09	.08	.....	.....
Gr. Mountain, Ca	125	10	*	.....	.....	212 No 81	7½	2.10	2.05	.....	.....	.....	.....	2.10	2.05	.....	.....	2.00	.....
Hale & Nor., Ne	112	100	3833	De 81	75	1688 Ap 71	0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hibernia, Co	300	25	*	.....	.....	12 Jy 81	10	.15	.10	.12	.....	.12	.11	.14	.10	.12	.11	.12	.....
Homestake, Dk	100	100	200	Ap 78	1 00	1330 Ap 82	40	.....	.....	.....	.....	17¼	.....	.....	.....	.....	.....	17¾	17⅜
Horn-Silver, Ut	400	25	*	.....	.....	8 00 Fe 82	75	12.50	12.25	.....	.....	.....	.....	.....	.....	12.5	.....	.....	.....
Hukill, Co	200	5	*	.....	.....	210 De 7	10	.....	.....	.....	.....	.....	.....	.51	.49	.49	.....	.....	.....
Independence	100	100	185	Fe 82	15	225 Se 80	25	.17	.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iron Queen, Ne	12	2	.....	Fe 80	15	832 Ap 82	05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Inyo, Ca	100	5	*	.....	.....	45 Ap 82	05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iron Silver, Co	500	20	*	.....	.....	600 Ma 81	20	2.10	..	2.10	.....	2.15	2.10	2.15	.....	2.20	2.15	2.20	.....
Joculistita, Mex	100	100	.....	.....	.....	200 Fe 82	1 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
La Plata, Co	200	10	*	.....	.....	400 Ap 80	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lacrosse, Co	400	10	*	.....	.....	19 Ap 82	05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.06	.....
Leeds, Ut	60	100	60	Fe 82	30	78 Oc 78	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Little Chief, Co	200	5	*	.....	.....	700 Au 80	50	1.00	.97	.27	.55	.95	.94	.....	.....	.93	.....	.9	.....
Little Pitts., Co	200	100	*	.....	.....	1350 Mr 80	50	.....	.....	2.1	.....	2.00	.....	2.00	1.8	2.10	.....	2.00	.....
Martin White, Ne	100	100	900	Ja 82	25	900 Jy 79	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Moose, Co	200	10	4	.....	.....	560 Mr 78	25	1.15	.....	1.15	1.05	1.20	.....	1.20	.....	1.30	1.20	.....	.....
Navajo, Ne	100	100	229	Mr 82	20	25 Mr 81	25	1.0	.95	.90	.....	.93	.90	.....	.....	.....	.....	.80	.....
N. Y. & Colo., Col	50	2	*	.....	.....	25 Jy 79	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N'h'n Belle, Ne	50	100	..	.....	.....	2188 Ap 82	50	.....	.....	.....	.....	.....	.....	.....	.....	8 38	.....	8.25	8.00
N. Belle Isle, Ne	100	100	25	Fe 8	15	30 Au 81	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ontario, Ut	150	100	.....	.....	.....	4250 Ap 82	50	35¾	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ophir, Ne	100	100	3192	Mr 82	1 00	1600 Ja 8	1 00	.....	.....	.....	.....	5.00	.....	6.00	5 50	4 75	.....	.....	.....
Osceola, Mich	50	25	..	.....	.....	650 Oc 81	1 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plymouth, Ca	100	10	*	.....	.....	151 Jy 79	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quicksilver, Pref., Ca	43	100	.....	.....	.....	396 Au 81	9 25	56½	.....	.....	.....	56¾	.....	.....	.....	.....	.....	.....	.....
" Com., Ca	57	100	.....	.....	.....	128 Au 81	2 25	12⅝	11⅝	.....	.....	.....	.....	.....	.....	12.0	.....	12¾	.....
Quincy, Mich	40	25	.....	.....	.....	360 Fe 82	8 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rising Sun, Ca	150	2	*	.....	.....	52 My 81	75	.....	.....	.....	.....	.36	.34	.....	.....	.....	.....	.....	.....
Robinson, Co	200	5	*	.....	.....	57 No 81	50	3.50	3.35	3.50	3.45	3.55	3.45	3.60	3 40	3.50	3.4	3.45	3.15
Robt. E. Lee, Co	500	500	.....	.....	.....	50 Jy 81	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Savage, Ne	112	100	25	Mr 82	50	4480 Ju 69	3 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.75	.....
Sierra Nevada, Ne	100	100	4950	Mr 82	1 00	102 Ja 7	1 0	6.00	5.88	6 00	.....	6.50	.....	10.00	9.75	8.50	8.13	9.25	8.00
Silver King, Ar	100	100	.....	.....	.....	600 Ap 82	25	16¼	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver King, Co	500	2	.....	.....	.....	50 Au 81	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spring Valley, Ca	200	1	*	.....	.....	50 Ja 81	25	4.05	4.00	.....	.....	.....	.....	.....	.....	4.00	.....	4.20	.....
Standard, Ca	100	100	50	Jy 78	1 00	56 0 Ap 82	75	19⅛	.....	19¼	18¼	19.00	18⅝	19.00	.....	19½	18¼	18¾	.....
Starr-Grove, Ne	200	10	*	.....	.....	16 Ju 81	10	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stormont, Ut	200	1	*	.....	.....	155 No 81	05	.....	.....	5	.....	..	.....	.....	.....	.....	.....	.....	.....
St. Joseph, Mo	100	10	*	.....	.....	330 Ma 81	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7 63	7.50
Tip Top, Ar	100	100	120	Mr 80	.....	100 No 81	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tombstone, Ar	500	25	*	.....	.....	15 Ja 82	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vizina, Ar	200	25	.....	.....	.....	14 Mr 82	10	.....	.....	2.0	.....	1.75	.....	.....	.....	2.00	1.80	.....	.....
Yel. Jacket, Ne	120	100	4150	Oc 81	1 00	2184 Au 71	3 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

SALES.—Alice, 400; Amie Consolidated, 90,900; Argenta, 1000; Bassick, 50; Belcher, 100; Bodie Consolidated, 540; Bulwer, 100; California, 12,115; Chrysolite, 34,050; Climax, 500; Consolidated Virginia, 20,965; Cooper Knob, 10,000; Dunkin, 800; Eureka Consolidated, 1185; Excelsior, 200; Father De Smet, 80; Findley, 500; Great Eastern, 3200; Green Mountain, 2100; Hibernia, 13,400; Homestake, 200; Horn-Silver, 734; Hukill, 1920; Independence, 200; Iron Silver, 5700; Leadville, 100; Little Chief, 6774; Little Pittsburg, 1430; Moose, 4800; Navajo, 4500; Northern Belle, 210; Ontario, 50; Ophir, 230; Quicksilver, preferred, 200; Common, 225; Rising Sun, 500; Robinson Consolidated, 103,800; Savage, 50; Sierra Nevada, 1585; Silver King, 200; Spring Valley, 525; Standard, 570; Stormont, 500; St. Joseph Lead, 200; Vizina, 1300. Dividend shares sold, 328,847.

REVIEW OF THE SAN FRANCISCO MARKET.

Taken as a whole, the San Francisco market this week has been a strong one. There have been a few exceptions; but the bulk of the list, acting in unison with the leader, Union Consolidated, has shown unusual strength. This has been due in part to the very favorable reports that have been circulated regarding the condition of the ore-breasts in Union Consolidated, but is mainly the result of manipulation on the part of the insiders. The outlook for a few of the mines at the north end is a little better, but there is hardly enough improvement to warrant any important advance in prices. In fact, the prospects of such of the Gold Hill companies as are affected by the flood are decidedly discouraging. One of the mine superintendents estimates that it will cost $500,000 to rid the mines of water, and this is stated to be a very conservative estimate. As all of these companies hold large amounts of their own stock bid in for delinquent assessments, it will be extremely difficult for them to raise the necessary funds to drain their mines and resume operations.

The following mining companies had a cash balance April 1st: Consolidated Virginia, $80,879, with back taxes paid; Gould & Curry, $13,534; Overman, $4100; Alpha, $522; Standard, $263,715; Tioga, $8000; Northern Belle, $21,434, and $52,104.56 in unsold bullion; Bechtel, $1100; Crown Point, $18,270; Justice, $7424; Bulwer, $82,247; Silver Hill, $5988; Potosi, $14,416; Challar, $14,379; Imperial, $3789; Bodie Consolidated, $55,356; Mono, $4203; Challenge, $273; Alta, $16,854; Andes, $11,639; Benton, $649. The following companies had an indebtedness April 1st: Utah, $4172; Mexican, $43,589; Ophir, $40,960; Hale & Norcross, $18,962; Best & Belcher, $7629; Sierra Nevada, $27,500; California, $61,000, with back taxes paid.

Recent assessments are as follows:

Name of company.	Levied.	Delinquent.	Sale day.	Amount per share.
Alpha Con	Mar. 20	Apr. 20	May 19	$0.50
Union Con.	Mar. 21	Apr. 21	May 15	1.00
Goodshaw	Mar. 21	Apr. 21	May 11	10
Sierra Nevada	Mar. 23	Apr. 23	May 15	1.00
Lighthall H. Co	Mar. 27	.....	May 16	1.00
South Bodie	Mar. 27	Apr. 27	May 25	.15
Bullion	Mar. 29	Apr. 29	May 24	.30
Silver Lick Con	Mar. 29	.....	May 27	.05
California	Mar. 29	Apr. 29	June 5	.20
New Coso	Mar. 30	Apr. 30	May 22	10
Monumental Tunnel	Mar. 31	.....	May 22	.05
Tellurium	Apr. 1	.....	May 24	.25
Niagara	Apr. 1	May 2	May 25	.20

Copper and Silver Stocks.

Reported by C. H. Smith, 15 Congress street, Boston, Stock Broker and Member of the Boston Mining and Stock Exchanges.

BOSTON, April 13.

The market the past week in copper stocks has been confined wholly to the producing mines, and prices compare favorably as a rule with last week, although in one or two instances we have to note a decline. Calumet & Hecla, notwithstanding the announcement of a $5 dividend, has

declined from $245@$240, without any apparent reason other than the absence of orders to purchase. Quincy, on the other hand, advanced from $45½@$47; but was a little weaker to-day at $46, which was, however, bid for it. Pewabic, early in the week, was quite active, and under a rumor that a consolidation with Quincy was talked of, advanced to $13; this, however, was not maintained, and the stock sold off again to $12, closing $11⅞ bid. Atlantic was steady at $14@$14½, with sales at both figures. Osceola declined from $37 (April 5th) to $34, with sales of 50 shares at that price to-day, and more offered. Franklin advanced steadily on good buying orders from $10¾@$11¼, and has been more active and in better demand than for some time past. The rest of the list is entirely neglected, and there is no disposition to operate in any of the purely speculative stocks.

In silver stocks, sales have been very light, and prices continue to decline. San Pedro sold at 50c., Catalpa at 40c., Crescent at 30c., Indian Queen at $2¼, and Bonanza at $4. Silver Islet declined from $20@$18, and Sullivan from $1⅛@$1⅛.

At the Boston Mining and Stock Exchange, business continues to be very dull, and the transactions limited to a few specialties. Milton was steady at 16@17c Deer Isle was in active demand, with sales at 16@20c., and Massachusetts & New Mexico remained steady at 22@21c.

3 P.M.—The market is without any special change, and closing prices as follows: Allouez, $2 bid, $2¼ asked; Atlantic, $14 bid, $14½ asked; Brunswick, $12 bid, $15 asked; Bonanza, $4 bid, $4½ asked; Calumet, $240 asked; Franklin, $11¼ bid, $11⅝ asked; National, $2 bid; Osceola, $35 asked; Pewabic, $11⅞ bid, $12 asked; Quincy, $46 bid, $46½ asked; and Sullivan, $1¼ bid, $1⅜ asked.

Coal Stocks.

NEW YORK, Friday Evening, April 14.

Under a very heavy business, the coal shares have depreciated considerably. New Jersey Central continues to be a prominent feature, the sales amounting to 180,570 shares at $81⅛@$74¾. The Chancellor of New Jersey has been applied to by the Gowen-Garrett party, for an order directing that an election for directors be held on May 5th, that being the regular date for such election. Delaware, Lackawanna & Western has sold to the extent of 174,510 shares at $122@$118¾. Delaware & Hudson records sales of 4195 shares at $105⅞@$104¼. Reading has been fairly steady the past few days; sales in this market for the week aggregate 158,400 shares at $62¼@$57¼@$60¾.

METALS.

NEW YORK, Friday Evening, April 14.

With the exception of tin, the position of the metals remains the same as during the last week.

Copper.—Small lots of copper were sold during the week at prices ranging downward from 18½@18c., the market at the close being tolerably firm at 18¼c., Arizona and Baltimore being quoted 18@18⅛c. Consumers, however, seem little anxious to pay more than 18c. Producers in the West will not be disposed to question the wisdom of the constant effort made by the lake companies to uphold prices, as it gives them an opportunity to build up their business and fortify their position. Still, it should not be forgotten that at any time the strong companies may tire of this policy. The present state of affairs is probably the most satisfactory one for them, as they are under no obligations, while they derive all the benefits which the course of the large producers secures. In the end, however, it will probably have to come to some attempt at a compromise. The Copper Queen is now producing at the rate of 4000 tons a year.

From London, our daily advices from Messrs. James & Shakspeare contain the following on the course of the market:

> On the 27th ult., there was a quiet market, which on the following day was followed by a decline which induced more business. On the 29th, there was a tolerably fair trade, which continued on the 30th and 31st. At the close, quotations for Chili Bars were £64¼ sharp cash, £64½ usual cash, and £65⅛ three months.

Tin.—The great feature of the week has been another sudden break in London yesterday, where tin dropped from £105 10s. to £95 10s. for spot and £97 for futures, the latter being the closing quotations. As yet no cause for the panic in England is known here; but, of course, the market followed gradually, bids of 23¼c. being made for floating parcels. The market closes with tin at 23½@23¾c. Singapore cables £106 cost, freight and insurance.

According to the daily London market reports by Messrs. James & Shakspeare, the market was dull on the 27th, and continued so until the 29th, when it suddenly gave way, and the decline continued to the date of our last advices, March 31st. At the close, values fluctuated considerably, the last figures being 107¼s. sharp cash, and 108½s three months.

In January, 1882 and 1881, the imports of tin were 3623 and 19,644 cwts. respectively, the re-exports being 7 and 3702 cwts.

Lead.—The market has been dull during the week, and prices range from 4·95@5·05c. for common, and 5·12½@5·15c. for refined, nominally. We understand that negotiations are pending for the sale of the entire shipments of Richmond lead until October 1st, the quantity being estimated at 7000 tons. A bid was made of 4·80@4·85c., but was declined.

By mail, Messrs. John Wahl & Co. send us the following:

> There has been no important change in the situation of our lead market since our last report. Business continues fairly active. The general tone of the market is strong and the few changes in values that occurred during the past week have been advances over former figures. We quote Soft Missouri freely salable at 4·75c. Receipts for

NON-DIVIDEND PAYING MINES.

NAME AND LOCATION OF COMPANY.		NUMBER OF SHARES.	Par.	ASSESSMENTS. Total levied to date.	ASSESSMENTS. Date and amount of last.	HIGHEST AND LOWEST PRICES PER SHARE AT WHICH SALES WERE MADE. April 8. H.	April 8. L.	April 10. H.	April 10. L.	April 11. H.	April 11. L.	April 12. H.	April 12. L.	April 13. H.	April 13. L.	April 14. H.	April 14. L.
Advance M.&M.Co	.....					57c	.....	57c	.....	58c	57c	58c	57c	58c	57c	57c	.....
Albion, s. L.	Nev.	150,000	10	33)	Nov. 81	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Allouez	Mich	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alpha	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Alta	Nev.	100,800	100	1,284,000	Dec. 81	50	.....	.....	1.50	1.40	.....	.....	1.35	1.30	.....	.....	.....
Alta-Montana, G.	Mon.	600 000	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Flag s	.....	120,000	10	*	.....	.....	*	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Atlantic Copper	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bald Mountain, G.	Colo	1,000,000	10	*	.....	..	1c	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Barcelona, G.	Nev	200,000	25	*	.....	..	.....	.....	.....	15c	14c	18c	.....	14c	.....	15c	14c
Battle Creek	Dak.	200,000	25	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bear Creek	Colo	3 0,000	1	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Beauce G'd M.M.C	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Becnte Con., G.	Cal.	100,	10	162,750	Dec. 81	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Best & Belcher, G.	Nev.	100,800	100	1,053,750	Jan. 82	50	5.00	.....	.....	.....	.....	6.25	.....	.....	.....	6.0	.....
Big Pittsburg, S. L.	Colo	200,000	100	*	.....	..	.....	.....	.....	6 c	.....	.....	.....	.....	.....	7 c	65c
Black Jack, G.	Cal.	1 , 00	2½	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	4c	.....	4c	.....
Bonanza Chief	Mon	1,000.0	1	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	4c	.....
Bondholder	Colo	20 ,000	2½	.....	.....	..	8c	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Boston Con., G.	Cal.	1.6,000	100	50,000	Sept. 81	20	.....	.....	.....	.....	.....	2 c	20c	27c	21c	24c	.....
Boulder Con., s.	Colo	900,00	10	.....	.....	..	3c	.....	.....	.....	.....	3c	.....	3c	.....	.....	.....
Bradshaw, s.	Ariz	225,000	10	.....	.....	..	24c	.....	22c	.....	25c	21c	.....	2.c	2 c	22c	20c
Bullion	Nev.	100,000	5	*	.....	..	.....	.....	.....	.....	.....	4c	.....	.....	.....	5c	.....
Bull-Domingo, s L	Colo	200,000	50	*	.....	..	15c	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bullion, G. s.	Nev.	100,000	10	3,892,000	Jan. 82	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bye and Bye	Ariz	100,000	10	*	.....	..	5c	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Calaveras, G	Cal.	500,000	1	*	.....	..	.....	.....	11c	.....	.....	.....	.....	.....	.....	.....	.....
Clav'r's W &M.Co	Cal.	.....	.....	.....	.....	.....	.....	.....	.....	.....	48c	.....	.....	.....	.....	.....	.....
Cal., B. H., G.	Cal.	100,000	100	400,000	Mar. 81	25	.....	.....	.....	.....	1.00	90c	90c	85c	90c	.....	.....
Carbonate Hill, s L	Colo	40 ,0 0	1	.....	.....	..	*	.....	.....	.....	.....	.....	.....	.....	.....	45c	.....
atskill, s.	Nev.	3 0,00	5	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central Ariz'na, s	Ariz	100.000	10	.....	.....	..	.....	.....	1.00	.....	.....	.....	.....	1.05	1.00	.....	.....
Chapparal	Cal.	.....	.....	.....	.....	..	5c	.....	6c	2c	4c	.....	7c	4c	6c	8c	5c
Cherokee, G	Cal.	150,000	1	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	81c	80c
Cheyenne Con., G	Dak.	30 , 0	1	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Clarence	Can.	.....	.....	.....	.....	..	75c	71c	.....	.....	.....	74c	.....	.....	.....	.....	.....
olorado Cent'l, s	Colo	300,000	10	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ol'mb'a Con., G.	Nev.	100, 0	50	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ons. Imp'r'l, G.	Nev.	500,000	100	1,425,000	Jan. 82	10	3c	.....	.....	.....	5c	.....	.....	6c	.....	6c	.....
on. Pacific, G.	al.	60,000	100	114,000	Jly 81	40	.....	.....	.....	.....	3 c	.....	.....	.....	.....	.....	.....
Coso Pay Rock, s	Colo	250, 0	1	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	40c	.....
Crescent, s L.	Colo	3 0,000	1	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Crowell, G. L.	N. C.	50 ,000	1	*	.....	..	.....	.....	7c	.....	9c	.....	9c	.....	5c	9c	.....
Dahlonega, G.	Ga.	200,000	1	*	.....	..	6c	.....	.....	.....	6c	.....	.....	.....	6c	.....	.....
Dardanelles, G.	Cal	1 0,000	10	.....	.....	..	1.35	1.20	1.30	.....	1.30	1.25	1.30	1.25	1 3	1.25	1.20
Decatur	.....	.....	.....	.....	.....	..	.....	.....	75c	70c	.....	.....	.....	.....	.....	.....	.....
Dunderberg, s.	Colo	150,000	10	*	.....	..	47c	.....	55c	50c	55c	54c	74c	52c	5 c	.....	.....
Durango, G.	D k.	500. 0	1	*	.....	..	1.75	.....	1.75	.....	1.75	.....	1 .5	.....	1 75	1.75	.....
Empire, S. L.	Ut'h	100,000	100	.....	.....	..	80c	74c	82c	80c	84c	81c	81c	82c	85c	83c	86c
Enterprise	Colo	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Exchequer	Nev.	100,000	100	655,000	Jan. 82	25	31c	29c	30c	2 c	24c	.....	31c	28c	32c	28	30c
Globe Copper	Ariz.	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gilyun Dale Con. G	Cal.	100,000	100	75,000	Jan. 81	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gold Placer, G.	Colo	200,000	25	*	.....	..	30c	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Goodshaw, G.	Cal.	100,000	100	145,000	Feb. 81	15	35c	.....	49c	.....	.....	52c	.....	50c	49c	.....	.....
Granville, G.	N. C.	800,000	1	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	4c	.....
Harshaw, s.	Ariz	100,000	100	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Head Center, s.	Ariz	100,000	10	55,000	May 81	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hortense, s	Colo	200,000	10	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Index	Cal.	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Julia, G. s.	Nev.	110,000	100	.....	Jan. 82	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kossuth, G. s.	Nev.	1 8,000	100	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lacrosse, G	Colo	100,000	10	*	.....	..	27c	.....	.....	.....	24c	.....	.....	.....	.....	.....	.....
Legal Tender, s L.	Colo	200,0 0	5	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Leviathan, s	Nev	100,000	1 0	350,000	Mar. 81	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lucerne, s.	Colo	500,000	10	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Malachite	Nev.	200,000	5	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mariposa Pref., G	Cal.	50,000	100	1 687 500	Dec. 81	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" Com., G	Cal.	100,000	100	1 0 0,000	Feb. 82	..	7c	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
May Belle, G.	Cal.	100,000	100	126,000	Feb. 82	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mayflower, s	Colo	100,000	100	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mexican, G. s.	Nev	100,800	100	1,800,800	Sept. 81	$1	.....	.....	7.00	6.50	.....	.....	10.75	9.50	8.13	7.88	8.50
Michoacan Synd.	Mex.	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mineral Creek, s.	Ariz	200,000	10	*	.....	..	.....	.....	.....	.....	2c	.....	4c	1c	3c	2c	.....
Miner Boy, G s L.	Colo	5 0,000	10	*	.....	..	7c	6c	8c	7c	.....	.....	9c	8c	.....	.....	8
Miller	Nev.	200,000	25	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mono, s	Cal.	50,000	100	400,000	Dec. 81	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Moose Silver, s.	Colo	3 0,000	10	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	20c	.....	.....	.....
Nevada Syndi.	.....	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Standard, G	Cal.	100,000	100	.....	Nov. 81	10	.....	.....	.....	.....	.....	25c	1bc	25c	.....	.....	.....
North State	N. C.	400,000	25	.....	.....	..	12c	10c	.....	.....	11c	.....	12c	10c	12c	11c	12c
N. Horn-Silv'r, s L	Utah	400,000	10	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Noonday	Cal.	6 ,000	100	.....	Jne 81	50	.....	.....	1.00	.....	.....	.....	.....	.....	.....	1.00	.....
Old Dominion, c.	Ariz	200,000	10	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oriental	Nev.	200,000	25	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Orm'd & Miller, s	Nev.	400,000	25	.....	.....	..	23c	2 c	24c	.....	23c	.....	23c	22c	23c	.....	23c
Overman, G s	Nev.	115,20	100	3,458,300	Jan. 82	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Potosi	.....	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Quartz Creek	.....	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rappahannock, G	Va..	250,000	1	*	.....	..	29c	28c	.....	.....	28c	.....	25c	.....	.....	3 c	9c
Red Elephant, s.	Colo	500,000	10	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	14c	16c	14c
San Pedro, G s L.	N. M	400,000	25	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Cliff, s.	Colo	200,000	50	*	.....	..	2.10	1.95	2.00	1.95	.....	.....	.....	.....	2.00	1.95	2.00
Silver Islet	Can.	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silver Nugget, s.	Ariz	200,000	10	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Silv'r N, n'w stk, s	Ariz	250,0 0	10	.....	.....	..	7c	6c	.....	.....	7c	6c	.....	.....	7c	6c	.....
Sonora Con.	Mex.	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sophie, G.	Cal.	100,000	100	85,000	Nov. 81	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Bulwer, G.	Cal.	100,000	100	195,000	May 81	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
South Hite	Cal.	100,000	5	.....	Jan. 82	10	18c	16c	18c	.....	20c	16c	18c	.....	18c	.....	.....
South Pacific	Cal.	.....	1	.....	.....	..	1.15	1.05	1.20	1.05	1.15	1.00	1.10	1.00	1.10	1.00	1.15
State Line No 1, s	Nev.	200,000	25	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" No. 2, s	Nev.	200,000	25	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" No. 3, s	Nev.	200,0 0	25	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
" No. 4, s	Nev.	200,000	25	.....	.....	..	.....	.....	.....	.....	14	.....	.....	.....	.....	.....	.....
" Nos. 1 & 4, s	Nev.	.....	.....	.....	.....	..	15c	12c	16c	15c	16c	14c	16c	15c	16c	15	16c
" Nos. 2 & 3, s	Nev.	.....	.....	.....	.....	..	6 c	4 c	7 c	5 c	63c	5 c	66c	5	7 c	62.	71c
Sutro Tunnel	Nev.	2,000,000	10	*	.....	..	63c	6 c	63c	50c	66c	60c	7 c	63c	66	63c	6 c
Tabor Mine	Colo	250,000	20	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Taylor Plumas	.....	.....	.....	.....	.....	..	10c	9c	14c	9c	14c	1c	15c	12c	10c	9c	.....
Toxa, G.	Cal.	100,000	100	2 1,000	Jan. 82	10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tuscarora, s	Nev.	100,000	100	95,000	Apr. 81	15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Unadilla, s.	Colo	5 0,000	1	*	.....	..	11c	.....	.....	.....	12c	.....	.....	.....	11c	15c	.....
Union Cons, G.	Nev	100,000	100	1,160,00	Jly 81	$1	9.5	.....	11.88	11.2	3.15	18.50	17.50	.....	15.50	14. 3	15 0
Utah	Nev.	20,000	100	1,210,000	Jan. 82	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vandewater, s.	Nev.	20 ,000	10	*	.....	..	47c	.....	.....	.....	.....	.....	.....	28c	.....	.....	.....
Washington, s.	Ariz.	200,000	5	.....	.....	..	.....	.....	8c	.....	.....	.....	1 c	5c	.....	.....	.....
Willsh re, G.	Cal	5 ,000	1	*	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

SALES.—Advance M. & M Co., 3600; Albion, 300; Alta-Montana, 900; Bald Mountain, 1000; Barcelona, 61 0; Best & Belcher, 450; Big Pittsburg, 2200; Bonanza Chief, 700; Bondholder, 300; Boston Consolidated, 6800; Boulder Consolidated, 1900; Bradshaw, 14,400; Buckeye, 500; Bull-Domingo, 100; Bye and Bye, 1000; Calaveras, 500; Calaveras W. & M. Co., 300; Cal., B. H., 3800; Carbonate Hill, 700; Central Arizona, 1 0 ; Chapparal, 46,400; Cherokee, 200; Clarence, 400; Consolidated Imperial, 1600; Consolidated Pacific, 200; Consolidated Pay Rock, 200; Crowell, 40 0; Dahlonega, 1300; Decatur, 7 0; Dunderberg, 1100; Durango, 500; Empire, 2900; Enterprise, 17,600; Globe Copper, 5300; Gold Placer, 500; Goodshaw, 1200; Granville, 500; Lacrosse, 1000; Mariposa, common, 100; Mexican, 795; Mineral Creek, 30,900; Miner Boy, 9400; Moose Silver, 400; North Standard, 800; North State, 10,500; Noonday, 300; Oriental & Miller, 11,900; Rappahannock, 2600; Red Elephant, 800; Silver Cliff, 1585; Silver Nugget, new, 7900; South Hite, 8800; South Pacific, 21 ,750; State Line, No. 4, 100; Nos. 1 and 4, 11,400; Nos. 2 and 3, 363,2 0; Sutro Tunnel, 5 ,86 ; Taylor-Plumas, 42,200; Unadilla, 2005; Union Consolidated, 1770; Vandewater, 1600; Washington, 2100; Report M. & M. Co., 800; Belvidere, 5000. Non-Dividend shares sold, 921,055. Total shares sold at all the Exchanges, 1,249,902.

the week foot up to 21,252 pigs, against 25,632 the previous week.

From St. Louis, Messrs. John Wahl & Co. send us the following by wire: The market is strong, and the local demand active; prices rule from 4·70@4·75c.

The imports of lead in January were 321 tons, making a total of 2598 tons since July 1st, 1881.

Spelter.—This metal is quiet, nothing having been done during the week. We quote 5⅝@5¾c. for Domestic and Silesian. The arrivals of foreign spelter are reported small, and what parcels do come are for delivery on old contracts.

The imports of spelter in January, 1882, were 1841 tons, making the total for the seven months since July 1st, 1881, 4119 tons, against 429 tons during the corresponding period of the preceding year.

Sheet Zinc is firm at 7¼@7½c.

Antimony.—We quote 12½c. for Hallett's and 14⅝@14¾c. for Cookson's.

Quicksilver.—Under date of April 6th, the San Francisco *Herald* says:

Spot holders are now demanding 37½c. with sales. The steamer City of Tokio will carry 700 flasks, shipped by B. Von Ammon, and 20 flasks, shipped by Parrott & Co., for Hong Kong, valued at $20,070.

Mr. J. B. Randol reports the product of the quicksilver mines in California for the month of March as follows:

	March.	Total 18-2.
Quicksilver Mining Co., New Almaden, Flasks..	2,078	5,633
Other mines in California..... "	1,968	5,843
		11,477

BULLION MARKET.

NEW YORK, Friday Evening, April 14.

The market is weaker here, under a decline in sterling exchange; but demand about the same abroad, with little doing.

DATE.	London Pence.	N. Y. Cents.	DATE.	London Pence.	N. Y. Cents
April 8....	52⅛	114⅝	April 12....	52⅛	114⅝
April 10....	52⅛	114⅝	April 13....	52⅛	114¼
April 11....	52⅛	114⅝	April 14....	52⅛	1 4¼

BULLION PRODUCTION.

MINES.	States.	For the week.	Month of March.	Year from Jan. 1st, 1882.
*Albion, G. S	Nev.			$7,108
*Alice, G. S.	Mont.			158,344
Alta-Montana G.	"		34,700	87,214
Barbee & Walker, S.	Utah.	2,438	5,049	29,018
Bodie, G	Cal	8,740	31,398	104,235
*Boston & Montana	Mont.		9,461	51,150
Caledonia, G.	Dak.		37,666	79,236
*Christy, S	Utah			23,420
*† Chrysolite, S	Colo.		44,746	119,390
*Contention G. S.	Ariz.		148,704	399,316
Crismon-Mammoth, G.	Utah	828	7,506	11,386
*Custer, G. S.	Idaho		64,128	206,068
*Deadwood-Terra, G.	Dak.			118,876
Eureka Con., G. S. L.	Nev.	40,760	120,827	278,777
Father de Smet	Dak.		36,720	94,334
Grand	Ariz.		36,200	56,200
Grand Central	"		115,400	325,400
Head Center, S	"			14,80
*Homestake, G	Dak.			196,160
Horn-Silver, S. L.	Utah.	42,500	232,760	895,110
*Hope, G.	Mont.			37,049
Idaho, G.	Cal		42,000	167,000
*Indian Queen, S	Nev.			18,153
Inyo Cons., G.	Cal			77,000
*Jacuistita, S.	Mex.			†51,923
*†Leeds, S.	Utah.		3,685	10,672
Manhattan, S.	Nev.			64,300
Mount Diablo, S.	"		31,075	71,975
Noonday, G.	Cal	6,750	6,750	31,960
Northern Belle, S.	Nev.	15,200	66,485	204,207
North Noonday, G	"	7,820	10,200	35,232
*Ontario, S. L.	Utah.		221,695	†645,115
Ophir, G. S.	Nev.			12,000
Pascoe, S.	Utah.			4,575
*Silver Bow, G. S.	Mont.			40,659
Silver King, S	Ariz.		14,400	74,600
Standard, G.	Cal	25,750	37,740	243,717
Star, G.	Nev.	1,650	7,400	19,150
Stormont, S.	Utah.		5,320	52,700
Syndicate, G.	Cal			8,000
Tintic M. and M. Co.	Utah.		1,979	20,485
*Tip Top, S.	Ariz.		23 000	71,902
*Tombstone, G. S.	"		115,000	‡399,696
Vizina, S.	"		60,000	136,000
Total amount of shipments to date				$5,753,712

* Official. † Net. *G. Gold. S. Silver. L. Lead.* ‡ Assay value.

Exports and Imports of Gold and Silver at New York.

Exports.

Week ended April 8th..	$925,500
Corresponding week last year...	228,000
Since January 1st, 1882.	13,987,253
Corresponding period last year	3,396,588

Imports.

Week ended April 8th	$24,988
Corresponding week last year	4,485,373
Since January 1st, 1882	1,110,611
Corresponding period last year	18,459,784

Foreign Bank Statements.—The governors of the Bank of England, at their weekly meeting, made no change in the bank's minimum rate for discount, and it remains at 3 per cent. During the week, the bank gained £103,000 bullion, and the proportion of its reserve to its liabilities was raised from 36⅝ to 42 5-16 per cent, against 43⅝ per cent at the same date last year.

Bullion Receipts at New York.—The bullion received from the mines at the various offices in this city during the week ended April 8th, as compiled from various sources, amounted to $230,000, as against $401,642.76 reported for the previous week. The receipts from January 1st, 1882, to date, are $4,424,895.80.

COAL STOCKS.

Quotations of New York stocks are based on the equivalent of $100. Philadelphia prices are quoted so much per share.

NAME OF COMPANY.	Capital Stock.	SHARES. No.	SHARES. Par Val.	Last Dividend. Mo.	Y.	R't.	Rate per Ann.	April 8. H.	April 8. L.	April 10. H.	April 10. L.	April 11. H.	April 11. L.	April 12. H.	April 12. L.	April 13. H.	April 13. L.	April 14. H.	April 14. L.	Sales from April 7th to April 15th inclusive.
	$		$				Per c'nt													
Am. Coal Co.	1,500,000	60,000	25																	
Cameron C'l	2,500,000	50,000	50																	
Col. C. & I.	10,000,000	100,000	10					49⅛	47¼	48	46	47⅛	47¾	53⅞	50⅛	53¾	50			21,350
hes. & O. RR	15,000,000	150,000	100					22		22	21⅜	22¼	22			21¼				1,400
onsol. Coal	10,250,000	102,500	100	Jan.	82	2														
umb. C. & I.	500,000	5,000	100																	
el. & H. C.	20,000,000	200,000	100	Feb.	82	1½	6	*	105¼	105¼	104⅜	105⅛	104⅝	105		105	104¼			4,195
n. L. & W. RR	26,000,000	524,000	50	Nov.	82	2	8	+	120⅝	120⅛	119	120⅝	119⅛	120⅛	119⅛	1 0⅛	1 8⅞			174, 10
ehigh C. & N	10,448,500	208,971	50	Nov.	81	3	5¼	41¼	41	4 ⅜	4⅜	41⅛	4 ⅛	40⅞	40⅝	4 ⅜	4⅛			2,780
eh. V'y R. R	27,042,900	540,858	50	Mar.	82	1½	6	61	60¾	61		60¾		61	60¾	61	60⅞			814
lary'd Coal	4,400,000	44,000	100			76	1½	1¾	16⅛							15				450
oncauk C'l.	2,500,000	25,000	100																	
lorris & Es'x	15,000,000	300,000	50	Jan.	82		7									124				100
ew Cen. C'l	5,000,000	50,000	100	Dec.	81															
. J. C. R. R.	20,000,000	200,000	100	Oct	76	2½	2½	81¾	79⅛	81⅝	77¾	79¾	76⅞	78	74¾	76¼	74⅝			181,570
enn. Coal	5,000,000	100,000	50							245										60
enn. R. R.	68,870,200	1,337,404	50	Nov.	81	4		6 ¾	61	61⅜	61	62⅛	6 ¾	62⅜	62⅛	62⅜	62¼			46,774
'h. & R. L.‡	34,278,150	685,563	50	Jan.	76	2¼	10	62¼	58	59¾	57½	60⅛	59¼	60⅞	59¾	60⅜	59⅛			2 6,204
pring Mt. C'l	1,500,000	30,000	50	Dec.	81	3½	7													

* 105¾. + 122. Total sales . 658,707.

‡ Of the sales of this stock, 67,804 shares were in Philadelphia and 158,400 in New York.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 14.

The market is dull in all departments, though, on the whole, there is no pressure to sell. Consumption, it is generally stated, continues heavy, but buyers are scarce.

According to the official statement published by the Bureau of Statistics, the imports of iron and steel into this country during the month of January were as follows, in tons of 2000 pounds:

	Jan., 1882.	Jan., 1881.
Pig	27,854	24,476
Bar	7,831	2,279
Iron rails	4,286	9,943
Sheet iron	724	165
Old scrap	12,533	9,149
Steel rails	18,250	6,999
Steel ingots, bars, sheets, and wire	$1,424,666	$380,096

American Pig.—Very little has been done during the week, and quotations remain unaltered, at $25@$25.50 for No. 1 Foundry; $23½@$24 for No. 2 Foundry; and $22@22½ for Gray Forge; Bessemer pig is $23@$24. Spiegeleisen is unchanged.

Scotch Pig.—During the week, about 1000 tons of various brands of Scotch pig have been sold at about our quotations, which, however, are nominal now. We quote: Coltness, $25½@$26; Eglinton, $22.50@$23.50; and Glengarnock and Carnbroe, $24@$24.25.

Rails.—During the week, a few thousand tons of steel rails have been disposed of at private terms. Present quotations are $52@$53 at mill. Iron rails are dull and quiet at $46@$48, while English iron rails, of which considerable quantities are now in store unsold, are $44@$46.

Old Rails.—There have been no sales during the week, and we quote, nominally, $28@$28.50 for Double Heads; and $27½ for Ts.

Scrap.—We have no transactions to report, and quotations are $29 for No. 1.

Philadelphia. April 14.

There has been no improvement in demand in iron in Eastern Pennsylvania, and card quotations are unchanged. The sales of pig-iron were for the most part in ordinary sized lots. Very little is offered, makers feeling that the heavy consumption must eventually drive consumers into the market. This belief helps to hold prices steady. Sales are occasionally made which would indicate a falling market. Good brands have not been shaken. No. 1 Foundry is quoted $24@$25. A few large buyers have provided for most of third quarter requirements at $24.50. No. 2 was sold as low as $22.50. Gray Forge is scarce in large lots, except where deliveries can be extended. There is nothing in the situation from the makers' stand-point to warrant the belief in lower quotations for the better grades. Foreign is neglected. Bessemer is uncertain, and buyers say they do not need any. It is probable that prices will weaken before business will be done. Muck bars were sold to-day at $43. Merchant bars run from 2·65@2·80c., and business is improving. Pittsburg lots were put down here at the former rate, the first for several weeks. Should this continue, prices will weaken to 2·7c. for summer delivery. Local freights are a little higher, and coal holds at outside prices. Labor is uncertain. Consumers are not ordering beyond sixty days, except when concessions can be obtained; and this is rare, owing to possibilities of scarcity. Structural shapes are strong and active. Construction operations are energetically pushed at 3·2c. for angles, 4c. for beams, and 4·2c. for channels and tees. The business for the week has been unusually large. Contracts for work on public buildings have been awarded. Plate and tank is in active demand; large orders are in hand. Tank is quoted at 3c.; refined, 3¼@3½c.; shell, 3¾@4c.; flange, 5c. Nails are very active at $3.40, and orders this week for prompt delivery for large lots could not be filled. Storekeepers in some localities have been selling below the card. Sheet-iron is strong, and orders are abundant. Wrought pipes are in fair demand at 60 per cent off. Steel rails are quiet at $54@$58; lower prices than $54, it is said, have been taken; summer deliveries are firm at $56@$58. In certain localities east of the Mississippi, railroad construction is less energetically pushed. When prices settle, large orders for winter delivery will be placed. Old rails are irregular; $28.75 is quoted. Sales are reported at $28.50. Some small lots are held at $30. Scrap is declining, and fair No. 1 sold to-day at $31.50.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 14.

Anthracite.

The trade has rarely been so dull, and what little activity was manifested in the beginning of the week, in consequence of the raw weather, has disappeared. There is, however, less cutting under circular rates than there has been in the past. Buyers do not show the least activity and what little is done is for urgent present requirements, as the opinion seems to prevail among dealers that lower prices will be reached. During the week, the regular spring meeting of the Western Anthracite Coal Association, which is composed of the shippers of coal to Buffalo and farther Western places, was held. The subject of cutting rates formed the principal topic of discussion. The tariff established was about 50 cents per ton on the average, below present nominal prices, and about 10 to 15 cents a ton below the opening prices at the same time last year.

The production of anthracite coal for the week ended April 8th was 396,118 tons, as compared with 652,244 tons the previous week, and 381,779 tons the corresponding week of 1881. The total production from January 1st to April 8th was 5,946,195 tons, as against 6,300,608 tons for the like period of last year, showing a decrease this year of 354,413 tons.

Bituminous.

The notice given by the Clearfield miners to their employers that they would demand an increase of wages for mining from 50 to 65 cents a ton, to take effect on the 15th, does not appear to disturb the

operators much; in fact, some of them, it seems would have no objection to a stoppage for a short time. They profess to be determined not to grant the advance, and believe that past experience has taught the men that they are able and willing to oppose unjust demands. It is believed that should there be a strike—which is doubtful—it will not last long. The announcement has not affected the attitude of the Cumberland operators, and if it was intended as an aid to the miners of that region, it is likely to prove a failure. It is stated, with some show of authority, that the strike of the Cumberland miners has not received the sanction of the central organization of the Knights of Labor, and the refusal of this indorsement, it is held, weakens their position. As yet, these labor movements have had no perceptible effect on trade. The heavy tonnage of the Clearfield region, and the anxiety on the part of some to market their coal, have unsettled prices for some time past, and $4.50@$4.75 would be a fair quotation, though higher figures are asked by some shippers. We hear that an Eastern road has contracted for 150,000 tons of coal.

STATISTICS OF COAL PRODUCTION.

Comparative statement of the production of anthracite coal for the week ended April 8th, and years from January 1st:

Tons of 2240 lbs.	1882. Week.	1882. Year.	1881. Week.	1881. Year.
Wyoming Region.				
D. & H. Canal Co..	42,424	784,413	44,906	915,651
D. L. & W. RR. Co.	63 848	978,775	66,017	1,045,071
Penn. Coal Co.....	21,487	247,895	20 508	272,056
L. V. RR. Co.....	6,247	238,.44	44,939	297,521
P. & N. Y. RR. Co..	2,430	44,4 3	1,809	14,856
C. RR. of N. J.....	45,442	541,263	27,792	500,148
	181,888	2,824,996	199,971	3,135,303
Lehigh Region.				
L. V. RR. Co.....	62,595	1,006,967	60,060	1,029,260
C. RR. of N. J.....	42,520	453,793	25,202	462,342
S. H. & W. B. RR..	.....	11,273	.....	1,176
	105,115	1,472,033	85,262	1,492,778
Schuylkill Region.				
P. & R. RR. Co	92,637	1,385,014	93,670	1,419,784
Shamokin & Lykens Val.....	15,767	251,657	2,088	236,635
	108,404	1,636,671	95,758	1,656,419
Sullivan Region.				
St Line&Sul.RR.Co.	711	12,495	788	16,108
Total	396,118	5,946,195	381,779	6,300,608
Increase.....	14,339	....	.....	.....
Decrease	.....	354,413	.....	.....

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Total same time in 1877 ..... 4,331,757 tons.
" " " " 1878..... 3,416,331 "
" " " " 1879..... 5,604,776 "
" " " " 1880..... 5,33 .185 "

The Transportation of Coke over the Pennsylvania Railroad for the week ended April 1st, and year from Jan. 1st:

Tons of 2000 lbs.	Week.	Year.
Penn. RR. (Alleghany Region).....	2,236	27,959
West Penn. RR	1,587	34,775
Southwest Penn. RR 37,800		475,980
Penn. & Westmoreland Region, Pa. RR	5,490	74,844
Pittsburg, Penn. RR 14,280		191,360
Snow Shoe (Clearfield Region).....	254	6 522
Total	61,647	811,440

The Production of Bituminous Coal for the week ended April 1st was as follows:

Tons of 2000 lbs., unless otherwise designated.

	Week. Tons.	Year. Tons
Cumberland Region, Md.		
*Tons of 2240 lbs.....	5,000	455,003
Barclay Region, Pa.		
*Barclay RR., tons of 2240 lbs.	7,092	109,020
Broad Top Region, Pa.		
*Huntingdon & Broad Top RR.	4,553	65,293
East Broad Top.....	1,332	26,691
Clearfield Region, Pa.		
Snow Shoe.	4,869	50,889
Tyrone and Clearfield..... 66,870		664,382
Alleghany Region, Pa.		
Pennsylvania RR..	9,446	123,307
Pittsburg Region Pa.		
West Penn RR.....	8,745	88,921
Southwest Penn. RR..	1,410	11,015
Penn & Westmoreland gas-coal, Pa. RR.....	24,565	328,955
Pennsylvania RR	15,140	163,891

* For the week ended April 8th.

Belvidere-Delaware Railroad Report for the week ended April 8th:

	Week.	Year. 1882.	Year. 1881.
Coal for shipment at Coal Port (Trenton)	.....	.....	2,017
Coal for shipment at South Amboy	14,.03	188.149	162,463
Coal for distribution.	12.762	183,220	247,580
Coal for company's use	2 086	35.108	29,806

The decrease in shipments of Cumberland coal over the Cumberland Branch and Cumberland & Pennsylvania railroads amounts to 49,531 tons, as compared with the corresponding period in 1881.

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DIVIDENDS.

HOMESTAKE MINING CO., 18 WALL Street,

NEW YORK, April 13, 1882.

DIVIDEND NO. 44.

The regular monthly dividend has been declared for March,

FORTY CENTS PER SHARE,

payable at the office of the transfer-agents, Wells, Fargo & Co., 65 Broadway, on the 15th inst.
Transfer-books close on the 20th inst.
H. B. PARSONS, Assistant-Secretary.

DEADWOOD-TERRA MINING CO., 18 Wall Street,

NEW YORK, April 10, 1882.

DIVIDEND NO. 17.

A dividend of
THIRTY THOUSAND DOLLARS,
being fifteen cents per share, has been declared for March, payable at the office of the transfer agents, Wells, Fargo & Co., 65 Broadway, on the 20th inst.
Transfer-books close on the 15th.
H. B. PARSONS, Secretary.

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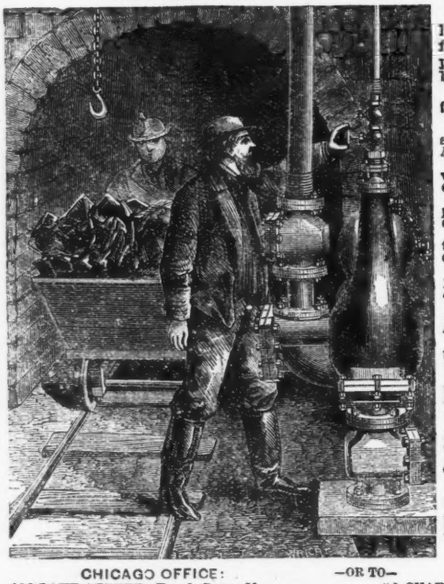

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Especially adapted for lifting water from one level to another.

"We consider it superior to any other steam pump."—*Michigan Coal Co., Jackson, Mich.*

"We heartily recommend it to any one who wants a good pump."—*McHenry Coal Co., McHenry, Ky.*

"It gives perfect satisfaction; uses comparatively little steam."—*River Bank Coal Co., Streator, Ill.*

"Is always in order, and more effective than any other steam pump."—*Coal Run Coal Co., Streator, Ill.*

"Doing good work; would prefer it to a piston pump."—*Ohio and Penn. Coal Co., Salineville, Ohio.*

"Gives perfect satisfaction; is all you claim for it."—*Cleveland Iron Mining Co., Ishpeming, Mich.*

"Has advantages over all other steam pumps for work inside mines."—*A. Tompkins, Pittston, Pa.*

"It will raise more water with less steam power, from a depth of from 50 to 60 ft. than any other pump known."—*Singleton Gold Mining Co., Dahlonega, Ga.*

"Without exception, I think it the best and most wonderful working pump that ever came under my observation."—*A. G. Stewart, Mining Engineer, Sherbrooke, P. Q., Canada.*

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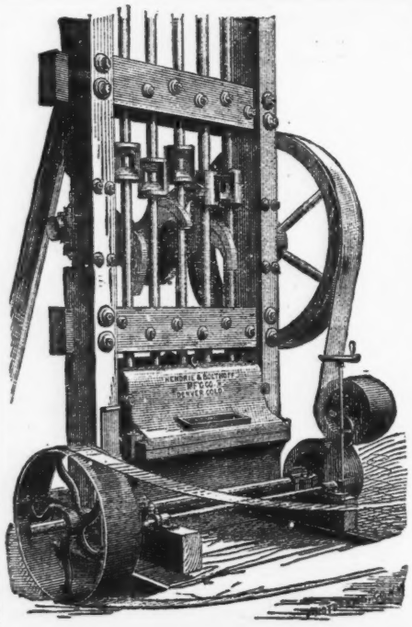

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